

Analysis of customer perception of product attributes in pet food: implications for
marketing and product strategy

by

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Abstract

The pet food industry continues to grow driven by higher disposable income and increased popularity of pet ownership amongst millennials. Research shows that pet food sales increased by 27% from \$59.3 billion in 2010 to \$75.25 billion in 2016. The increase in demand is accompanied by growing preference for specialized product attributes such as natural, organic, and many other premium product attributes. Research shows that many pet food trends today mimic human food trends as there is a growing tendency among pet owners to humanize their pets. These trends have forced companies to re-evaluate their production and marketing strategies in order to take advantage of the profit potential. They have begun using product differentiation based on various intrinsic attributes (e.g. color, texture, smell, appearance, etc...) and extrinsic attributes (e.g. brand, denomination of origin, image, etc...). As companies aim to accommodate the increasing specialized demands of consumers, they must be aware of consumer's perception of value associated with different product attributes. The ability of the companies to accurately analyze and interpret consumer value perceptions and expectations is crucial for successfully capturing and maintaining market share in expanding specialty pet food categories.

There is emerging literature in this area examining customer preferences and willingness to pay for specific attributes of pet food. However, the extent of this literature is limited by the availability and quality of consumer data. Recent advancements in information and communication technologies combined with the growing trend of online shopping in general and pet food in particular have generated new data source and provided opportunity for analysis of consumer perceptions. The online pet food and supplies purchases in the U.S. have increased by 58% from \$1.18 billion in 2011 to 1.86 billion in 2015. Studies in other areas such as human

food, health, services, banking, and many other markets have used online review data to study consumer preferences. However, there are no such studies in pet food. The growth in pet food and increasing profit potential combined with increased online shopping provides a good opportunity for research in this area.

The purpose of this thesis is to provide insight on consumer perception of pet food product attributes. Specific objectives include identifying major emerging consumer trends in pet food, examine strategies used by pet food in designing and communicating points of differentiation targeted at emerging consumer trends, analyze consumer perception of the value associated with intrinsic and extrinsic attributes of specialty pet food products.

The analysis are based on the data from consumer reviews of online pet food buyers. Websites such as Amazon, Chewy, and Pet Food Direct are used to obtain consumer review, as they are the leading websites for pet food sales. Data on company marketing strategies is obtained from websites and packages of the companies associated with the select specialty pet food brands and product lines. Methods include utilizing the R Studio Statistical software to conduct a content analysis of the consumer reviews. A comparative analysis is performed to examine differences in perception of attributes by customers in different categories based their rating of the product and shopping experience.

The primary results showed both companies are primarily marketing the health/benefit characteristics to customers. The results also revealed pet food customers tend to place the most value on health/benefit and ingredient characteristics. The three-circle analysis results showed that each of the attributes and terms marketed by both companies are perceived by customers. This implies that both companies are successfully communicating the value of their products to customers. However, there is potential for both companies to increase their current product

positioning strategy to incorporate attributes highlighted as value/needs. The alterations in marketing approach can increase competitive advantage over other companies in the market. The insights generated by this research have a potential to inform marketing, product strategy decisions, and facilitate successful product differentiation by companies in the pet food industry. The methods and the results of this research contribute to the literature in the area of agribusiness and agri-food marketing in general and pet-food marketing in particular, thus it will potentially generate interest among agribusiness scholars and pet-food industry stakeholders.

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Chapter 1 - Introduction and Objectives

1.1 Research Motivation

The pet food industry is a growing industry driven by increased pet ownership amongst millennials, and growing demand for premium products (Beaton, 2018a; Zion Market Research, 2017). Global pet food sales increased by 27% from \$59.3 billion in 2010 to \$75 billion in 2017 (Statista, 2017a). The increase in demand is accompanied by growing preference for specialized product attributes such as natural, organic, and many other premium product attributes. In 2018, the U.S. premium dog food sales represented 55% (\$12.28 billion) of the \$22.19 billion in the U.S. dog food market (Passport, 2018a). Due to the increase in demand for specialized products, opportunities now exist for pet food companies to differentiate and capture a larger share of industry's profit potential. Successful product differentiation requires not only effective and efficient product innovation and production capabilities, but also effective marketing and communication strategies. As a result pet food producers and industry stakeholders are continuously re-evaluating their marketing and sales strategies which in turn drives a need for new and innovative research in the field of customer behavior focusing on pet food buyer preferences and perceptions (Ampuero & Vila, 2006; Rettie & Brewer, 2000; Silayoi & Speece, 2007). As the need to differentiate continues to increase, the need for literature to help companies identify how to effectively and efficiently market pet food products to pet owners. Despite the growing need for studies to inform product and marketing strategy decisions, the literature in this area is still relatively limited.

There is an emerging strand of literature examining customer preferences and willingness to pay for specific attributes of pet food (Boya, Dotson, & Hyatt, 2015; Freiwald, Litster, & Weng, 2014; Koppel, Suwonsichon, Chambers, & IV, 2018). However, the extent of this literature is

limited by customer data availability and quality. Recent advancements in information and communication technologies combined with the growing trend of online shopping in pet food have generated new and rich data on customer preferences. This in turn, has provided new opportunities for analysis of customer perceptions of various pet food brands, products, and attributes. Furthermore, there is evidence that online customer reviews not only reflect the perceptions and experiences of existing customers, but can also play an important role in influencing the perceptions and shopping behavior of potential new customers (Chen & Xie, 2008). For example, online reviews describing positive post-purchase experience of existing customer can affect potential new customer's pre-purchase perception of value, thus leading to increased sales and growth in market share (Ho-Dac, Carson, & Moore, 2013).

Studies in other areas such as human food, health, services, banking, and many other markets have used online review data to study customer perceptions (Ampuero & Vila, 2006; Chen & Xie, 2004; Kolbe & Burnett, 1991). This approach to analyzing customer perception provides benefit as it captures a larger study sample size, while also providing specific information of what customers value (Jr, Donovan, Chen, & Jr, 2003). Despite the apparent advantages of this approach, there are no such studies utilizing online customer review data in pet food. The recent growth in the pet food market and increasing profit potential from specialized attributes combined with increased online shopping provides a good opportunity for research in this area.

1.2 Research Objectives

This research aims to examine if customers actually perceive pet food products in the way the companies are intending to position them. The analysis used in this study is based on a word count analysis of customer reviews and product descriptions. More specifically, the study

will focus on the frequency of keywords used in online customer reviews to see if they match the keywords used by pet food companies in their product description material. Specific objectives include:

1. To determine the attribute-based differentiation strategies pet food companies' use to position specific pet food products in the market.
2. To determine customers' post-purchase perception of value derived from various attributes of specific pet food products.
3. To determine the extent to which the customer perception of the value derived from specific attributes aligns with the companies intended attribute-based differentiation.

The analysis is focused on examining the frequency of key words used in the reviews and product description. The extent of word context analysis will be limited to the examination of customer rating associated with the review (e.g. 4- and 5-star ratings versus 1- and 2-star ratings). The analysis will involve identifying the most frequently used words (e.g. number of times the word appears in reviews/product descriptions), as well as, the words used by most customers in describing the product/experience (e.g. the number of distinct reviews where the word appears at least one time). Product position theory will be used to address the company's ability to position their products in the mind of the customer.

Achieving the objectives above not only provides insight which can benefit industry marketing decision makers, but can prove beneficial to academia researchers, the state of Kansas, and the agriculture industry as a whole. Pet food production is primarily produced in the states of Kansas and Missouri. More specific, pet food production and employment is highest in the animal health corridor (geographical location ranging from Manhattan, KS to Columbia, Missouri) than any other locations in the U.S. (Decision Innovation Solutions, 2017). In

2014, companies located in the Kansas City (KC) Animal Health Corridor represented 56 percent of total worldwide animal health, diagnostics and pet food sales. (KC Animal Health Corridor, 2017). This research can benefit pet food producers in the animal health corridor region and the state of Kansas to help them ensure they are producing and marketing product characteristics customers demand. The state of Kansas and Kansas State University will benefit from this research as it highlights the academic research in this area being conducted at the Kansas State University, the only university with a Grain Science & Industry Department and a pet food major, which have been the front runners for research in the pet food industry.

In addition, the insights generated by achieving these research objectives can assist both larger and smaller pet food production companies by highlighting the areas industry leaders are taking advantage of to capture a larger market share, which can assist industry leaders in identifying where they are in the market and areas, they can take advantage of to increase the competitive advantage in the market. Smaller pet food producers can benefit as they identify characteristics, they should incorporate into their product to increase their ability to compete with industry leaders. Smaller companies can also utilize this research to identify product features customers demand which no one is offering, allowing them to increase their market share.

The research is organized into nine chapters. The next chapter will provide background on industry, followed by the chapter three that defines key terms and theories used as a basis for this study. In addition, Chapter 3 will discuss previous literature utilizing online customer review analysis. Chapter 4 will present the conceptual framework of the research. Chapter 5 will characterize the data and the coding used to collect and clean data. Following Chapter 5, the methods chapter will detail the methods used to analyze the data. The results will be discussed in

Chapter 7 and the conclusion chapter will summarize the findings, discuss limitations of the research, and present marketing implications to improve product positioning.

Chapter 2 - Background

2.1 Industry Overview

In 2017, the global pet food industry totaled \$75 billion in revenue (Phillips-Donaldson, 2017a; Statista, 2017a). At that time, the industry was primarily controlled by the top 5 companies (all U.S. based companies) in the market with a combined 47% of the market share (“Global pet food sales, 2017 | Statistic,” n.d.; Phillips-Donaldson, 2018). The pet food industry is broken into three different segments: dog food, cat food, and small pet food (small mammals, and reptiles). The dog food market has been the most profitable largest segment of the three and accounted for 60% of the \$75.25 billion total pet food sales in 2016 (Intel Group Ltd, 2016; Statista, 2017a, p. 201; Zion Market Research, 2017). However, horizontal integration of companies within the dog and cat food segments has been observed as the market continues to grow as industry players attempt to capture many different target markets. For example, more than 30% of companies offer products in at least two or more pet food segments (Pet Food Industry, 2017a). This approach has demonstrated success to both Mars Inc. and Nestle Purina Inc., who ranked first and second amongst all global pet food companies in 2018.

2.1.1 Global Pet Food Market

The global pet food market is a highly concentrated market. In 2017, U.S. and West Europe were the largest customers of pet food combining for 66% of the global retail dog food sales. According to recent studies, the premiumization phenomenon has been the primary trend driving the global pet food industry. Premiumization is defined as the change in pet food customer preferences away from cheaper, generic product towards higher priced, differentiated products with premium attributes (Phillips-Donaldson, 2017c). Product characteristics such as natural and grain-free has become increasingly popular in both developed and developing

markets. For instance, the average price of pet food sold per kilogram increased by \$1.14 in China between 2014 and 2017 (Beaton, 2018a). Although natural and grain-free products may not be as prevalent in other developing regions such as Eastern Europe, premium products continue to thrive (“Euromonitor International—Analysis,” n.d.). As more developing countries embrace the premiumization trend, the size of the global pet food market is expected to continue growing (Passport, 2017b).

2.1.2 U.S. Pet Food Production

The U.S. pet food market is a primary contributor to the global pet food retail sales. In 2018, the U.S. accounted for \$22.19 billion of the total \$55.2 billion in dog food sales (Passport, 2018a). In 2016, there were approximately 65 recognized pet food companies operating in the dog food market, 90% of which offered both dry and wet dog food varieties (Passport, 2017b; Pet Food Industry, 2017a). In that period, the top five U.S. pet food companies controlled 63% of the market, as shown in Table 1. The Midwest region is the primary region for both pet food production and value-added production. The state of Kansas alone had a total of 63 manufacturing facilities, 15 of which produced only dog and/or cat food, in 2013.(Phillips-Donaldson, 2015) There are 31 pet food manufactures in the geographic area between Manhattan, KS and Columbia, MO, which is considered as the Animal Health Corridor. In 2016, Missouri was the leading industry producer contributing 53,528 jobs to the state’s economy. Pennsylvania and Kansas ranked second and third in this category contributing 33,533 and 33,381 jobs respectively (Decision Innovation Solutions, 2017).

Table 1. Top 10 Pet Food Companies in 2017

Company	Country	Annual Revenue	Industry Market Share (\$75 billion)
Mars Petcare Inc.	United States	\$17,224,400,000	22.9%
Nestlé Purina PetCare	United States	\$12,500,000,000	16.7%
Hill's Pet Nutrition	United States	\$2,292,000,000	3.1%
J.M. Smucker	United States	\$2,100,000,000	2.8%
Diamond Pet Foods	United States	\$1,150,000,000	1.5%
Blue Buffalo	United States	\$1,275,000,000	1.7%
Spectrum Brands / United Pet Group	United States	\$801,120,000	1.1%
Ainsworth Pet Nutrition	United States	\$800,000,000	1.1%
Unicharm Corp.	Japan	\$752,653,669	1%
Deurerer	Germany	\$721,100,000	1%
Total		\$39,616,273,669.00	52.90%

Source: Euromonitor Passport 2018 Pet Food Report

2.1.3 Distribution Channel

The most common channel for pet food distribution is store-based retailing. In 2017, store based retailing represented 85.8% of the pet food distribution market share in the U.S. (Passport, 2018b). Grocery retailers, such as supermarkets and mass merchandisers, have dominated the pet food distribution channel for well over a decade primarily appealing to the customers groups from Baby Boomer, Builder, and Gen-x generations. This is accredited to the convenience of purchasing pet food in places where they already shop for everyday items, as well as the selling of premium food at a value price. In 2016, grocery retailers comprised of 37.5% of all pet food sales in the U.S. However, in 2017 their pet food market-share dropped to 36.1% as pet superstores, online shopping, and home and garden specialist retailers were able to increase their share (Passport, 2018b). The share of online retailing of pet food displayed the highest growth reflected by more than five-fold increase from 1.5% to 8.4% between 2012-2017 (Passport, 2018b). This form of shopping has become increasingly popular amongst millennials (customers born between the years of 1981-1996) who ranked online shopping as their third most

common pet food purchasing option. Market researchers found that dog owners with higher incomes who buy premium foods are most likely to purchase their pet food online instead of traditional in-store purchasing (Passport, 2019). Pet food e-commerce is expected to continue growing as customers can purchase the same specialty brands with the added convenience of home delivery and recurring order programs. (Phillips-Donaldson, 2017b).

2.2 Pet Food Demand

2.2.1 Customer Preferences

Changing customer preferences is the primary driving force in the pet food industry today. As highlighted in a 2017 Mintel Report, pet food demand continues to shift towards the humanization trend as pet owners increasingly look to align the diets of the pets with their own personal healthy diets and beliefs (Mintel Group Ltd, 2017). Humanization is the term coined for pet owners who attempt to think of and treat their pets as if they were humans (Pet Food Industry, 2015). In other words, as humans attempt to improve their diets by eating food that is perceived to be healthier, they choose healthier food for their pets. (Pet Food Industry, 2015; Zion Market Research, 2017) In addition, the shift in demand towards more expensive premium products has also been accredited to the increase in ownership of small breed dogs (Phillips-Donaldson, 2016). The increase in urbanization and limited living spaces has made small dog breeds the ideal pet for many customers (Beaton, 2018b). Many market analyst consider the small breed dogs and cats to benefit most from the humanization trend as they are typically the ones receiving the most pampering from pet owners (Passport, 2017b). As customer preference of smaller dogs has increased, it has resulted in a decrease in customer purchasing volumes (Beaton, 2018b). This is due to the lower calorie needs for small dogs decreasing the portion size purchased, therefore resulting in a decrease in volume sold. As time progresses, the taste and

preferences of customers will continue to change driven by humanization, premiumization, urbanization and other socio-cultural and economic forces (Hunt & Morgan, 1995).

2.2.2 Current Product Demand Trends

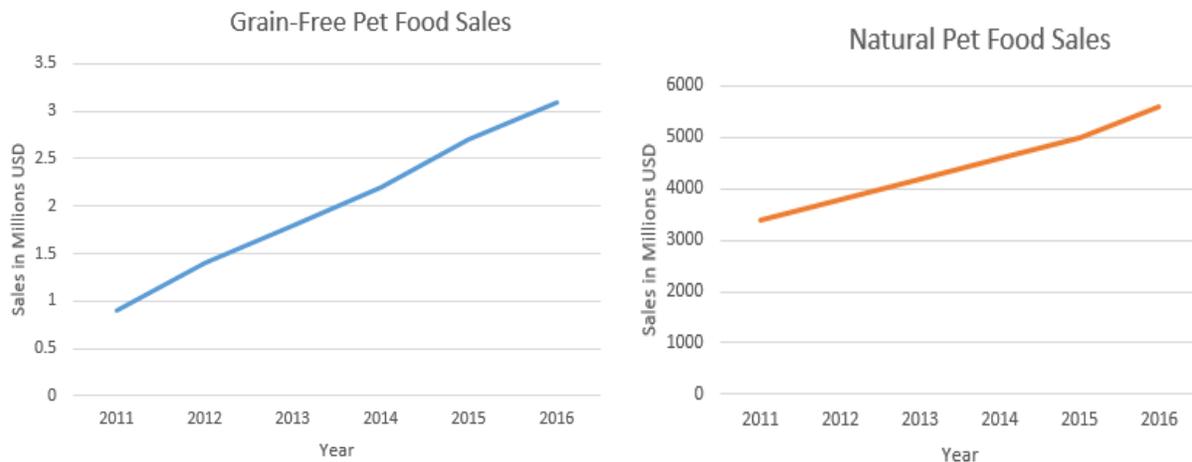
Dry pet food has been the most prominent product purchased over the past decade among pet food categories. In the dog and cat food industry combined, dry food sales totaled \$17.34 billion of the \$29.7 billion in sales between the two industries in 2016 (Passport, 2017b, 2017a). Many customers prefer dry food over wet food primarily due to convenience, pricing and ease of storage (Dog Food Advisor, 2011; Passport, 2017b). Some also accredit this to animal health as wet food is said to increase the chances of gum disease. (Passport, 2017b; Zion Market Research, 2017). The wet and dry pet food markets can be loosely broken into three subcategories: economy, mid-priced and premium. Of the three subcategories, the premium dry pet food was most popular dry food consumed in 2017 (Gomez Baquero et al., 2018). As pet food companies see the increased demand for these products, they have bombarded the market with premium products to take advantage of the market.

2.2.3 Product Attribute Trends

Natural and grain-free products have been the most prominent as they both have shown significant growth over the past 5 years (Statista, 2017b; Wall, 2017); displayed in the Figure 3 below. As the demand for natural products continues to rise, the grain-free trend is expected to decline. Nutritionist have now found that some pets, dogs in particular, are suffering from diet related diseases due to the nourishment imbalance caused by the lack of grains in the products (Wall, 2018). Pet food specialist also accredit the decline to increased demand for specialized grain products such as ancient grains (grains which have remained unchanged over the last several hundred years) (Aldrich, 2017). In addition to ancient grains, there has been an increase

in the production of other product attributes such as peas, carrots, pumpkin, berries and fruits, and many other foods commonly found in human diets (Stevens, 2017). As pet owners demand more premium characteristics it is imperative that pet food companies market their products successfully to capitalize on the new opportunities (Beaton, 2017; Trivikram, 2017).

Figure 1. Grain Free & Natural Pet Food Sales (2011-2016)



Source: Euromonitor Passport 2017 Pet Food Report

2.3 Marketing and Differentiation Strategies in Pet Food

The fierce competition in the pet food market has led to increased marketing cost and increased competition for shelf space (Beaton, 2017; Fuchs & Claudia, 2011). Of the many solutions available to address the competition in the market, one in particular that has been adopted by pet food companies is product differentiation. This is evidenced by pet food companies attempts to stand out through increased innovation in pet food products and easy to use repackaging schemes highlighting the quality of their products (Beaton, 2017; Grand View Research, 2016). This has become a crucial component of pet food product marketing as companies have now realized the importance of appealing to both the needs of the pets (health,

etc....) consuming the product and the preferences of owners purchasing the product. However, FDA regulations prevent companies from making medical claims which would give rise to vertical product differentiation (FDA Center for Veterinary Medicine, 2017). Moreover, as pet food customers embrace the humanization trend, it is important that product packages highlight key ingredients and nutritional benefits to inform customers of the unique benefits of their products (Fuchs & Claudia, 2011). In addition, companies must be aware of the customer's perception of their products to ensure they are differentiating successfully (Ampuero & Vila, 2006).

Chapter 3 - Literature Review

This section will discuss the relevant literature in the field of product differentiation theory, customer perception theory, and the use of online customer review analysis. Subsection 1 will describe how product differentiation theory has been defined in previous literature and the advantages of successful application. The second subsection will address customer perception theory and the importance of understanding customer perception of products in the market. Previous that used online customer review analysis will be discussed in the third subsection; reviewing both food and nonfood studies, which used this technique. Lastly, the fourth subsection will summarize the findings and limitations of previous approaches. This will set the stage for the application of online customer review analysis of the pet food industry to identify the overlap between marketed and perceived product characteristics.

3.1 Product Differentiation Theory

This subsection will focus of product differentiation theory. Product differentiation is defined as the ability to distinguish a product from competitive products to make it more attractive to a target market (Dickson & Ginter, 1987). Each seller provides a differentiated product using distinguishing factors based upon a product's characteristics, physicality, perception, associated service, and distribution (Baker, 2013). Two products are differentiated if there is some price at which some customers prefer to purchase product A and other prefer product B (Besanko, Dranove, Shanley, & Schaefer, 2010). Understanding product differentiation is crucial to understanding how modern market economies function. Traditionally, product differentiation theory was described as the difference between the variety of products which appear in the market (Anderson, Palma, & Thisse, 1992). However, very little awareness was known about the theory at the time. Wendell Smith's 1956 study expanded Chamberlin's

theory as he compared product differentiation and market segmentation in terms of marketing strategies. Smith defined product differentiation as the adjustment of demand which was dependent on the offering by a supplier (Smith, 1956). He went on to characterize product differentiation as the use of heavy advertising to promote differences in a product in an attempt to control the demand of a market. Porter expanded Chamberlin and Smith's definition as he characterized product differentiation as any product perceived as unique by customers (Porter, 1980). This definition helped to identify the importance of customer product perception. In 1988, Mintzberg took product differentiation a step further as he highlighted the sources of differentiation into categories such as quality design, price, and differentiated products (Mintzberg, 1988).

In the 21st century, research on product differentiation increased in terms of being more specific. In a 2008 study, Ethiraj and Zhu expounded on vertical and horizontal differentiation as they relate to the performance of innovators and imitators. They found that the nature of the type of product differentiation, which exists, is dependent on the amount of information known about the product. When there is limited amount of information provided about the product, most imitators will focus on horizontal differentiation. However, the greater the information revealed over time, imitators subsequently move into vertical differentiation as they attempt to improve the product quality (Ethiraj & Zhu, 2008). In 2010, Saitone and Sexton evaluated product quality and differentiation research related to the food industry. They concluded that modern food customers value a diverse option of differentiated products. Furthermore, exploiting market niches and utilizing product differentiation is an important key to success, there are often substantial fixed costs which may offset the potential gains from imitative product differentiation (Saitone & Sexton, 2010).

3.1.1 Importance of Product Differentiation

Customers are faced with many decisions that helps them determine which product to purchase in a competitive market. In certain scenarios, price is the primary determining factor. However, during instances where the product pricing is equivalent, customers must rely on non-price product characteristics to aid in their selection (ENSTRÖM & GHOSH, 2016). The difficulty of the decision is magnified given that many products in the market are very similar to competitive products. Moreover, they are unable to evaluate the many different substitute products in great depth resulting in the use of their decisions (Häubl & Trifts, 2000). After deductive reasoning process occurs, an in-depth evaluation and comparison of products occur based on important product attributes. A purchasing decision is then made based on the product characteristic which closely mirrors what the customer desires (Chandon, Hutchinson, Bradlow, & Young, 2006). A company can make this decision easier for customers through clear marketing of the uniqueness of their products which aligns with the demand of the customer (Mugera, Burton, & Downsborough, 2017; Trivikram, 2017). Because of this, companies must comprehend product differentiation and how to successfully achieve it.

3.1.2 Achieving Product Differentiation

To successfully achieve product differentiation, companies must identify and pinpoint a unique selling point which offers a unique benefit to the customer. Yet, it all depends on how the customer perceives the product. Two conditions must exist to attain product differentiation. First, customers must recognize the distinctive selling point of differentiation. Without the selling point, they will not have the ability to distinguish between the product and its substitutes. Furthermore, any differentiation must be valued by customers to be successful (Miller & Friesen, 1986). Secondly, each company's demand for the product must be downward sloping; meaning a

negative relationship exists between product demand and price. With increased competition, customer demand has been divided amongst different players in the market. As a result, it is important for businesses to make their customers understand what they have different to offer. In doing so, a sense of value is created and attached to their product that can potentially increase recurring purchases and brand loyalty.

3.1.3 Types of Product Differentiation

There are two types of product differentiation: horizontal product differentiation and vertical product differentiation. Vertical differentiation occurs when there are goods in the market which can be ranked from highest to lowest in terms of quality (Flam & Helpman, 1987). In other words, one good is "better" than another, which in turn plays a larger role in a customer's preference for one good over another (Bhargava & Choudhary, 2001). A producer can achieve vertical differentiation by offering a product which is unequivocally better than competitor products in the market (Besanko et al., 2010). If a product is differentiated through vertical differentiation, customers may form biased perceptions of products in the market as some products are perceived as superior to others. Product differentiation theory implies that all customers prefer the higher quality product if two distinct products are offered at the same price (Mugera et al., 2017). As a result, higher quality products cost more to produce and therefore require a higher priced selling proposition. Higher quality products are also priced higher than those perceived as lower quality as customers are usually willing to pay more for increased quality (Spaeth, 1979). Although customers are may disagree about how much they are willing to pay for a higher quality product, vertical differentiation enhances the product for all prospective customers (Besanko et al., 2010).

Horizontal differentiation occurs when a company's unique selling point is based on a characteristic which cannot be ranked in terms of quality (Lancaster, 1979). In other words, horizontally differentiated products vary only marginally, as it is more efficient for producers to try to capture as many new customers as possible with minimal additional costs. While horizontally differentiated products tend to sell at similar prices at equilibrium, the lack of relationship to quality may not entail that they cost the same. A company may achieve horizontal differentiation by adding a specific product feature a product to make the product more attractive to customers who like the specific features (Besanko et al., 2010). For example, a producer may add a strawberry scent to their product to appeal to customers who like the scent of strawberries. Moreover, the greater the number of product characteristics that customers perceive as beneficial, the stronger the degree of horizontal differentiation (Bracha & Syed, 2013). As companies seek to gain competitive advantage and increase market share, it is important to understand the concept of position strategy (Choi, Desarbo, & Harker, 1990; DeSarbo & Rao, 1986; Hunt & Morgan, 1995).

3.1.4 Product Positioning

Trout and Rise first emphasized the idea of product positioning in a 1972 book where they defined it as the ability to successfully place a product in the mind of customers. In markets where there are a large number of companies offering very similar products, positioning allows a company to market and be heard in an over-communicated market (Demaris, Ries, & Trout, 1992). Positioning is based on the way customers think, evaluate, compare, prioritize and select the product attributes they most desire. If aligned correctly, companies can position their product as better than competing products; leading to competitive advantage (Gruca & Klemz, 2003). Although positioning begins with the product and the marketed characteristics, it can be said that

the positioning of a product induces its marketing mix (pricing policy, place, products and promotion) (Maggard, 1976; Aaker, 1996; Binge and Vila, 2000). Later on, marketing mix elements (product, price, distribution and advertising) reach customers and contribute to determining the desired product positioning in the minds of customers (Maggard, 1976).

3.1.5 Achieving Product Positioning

The extent to which a brand is successful in achieving a desired position in the market depends on the effectiveness of achieving the right “mix” between association and differentiation (Punj & Moon, 2002). Proper association is an important aspect of any product positioning strategy. If too much emphasis is placed on associating with a category, it may become difficult for the brand to differentiate from other brands. In contrast, if there is too little emphasis on attaining association with a category, differentiation could be void because customers may be unable to comprehend the unique features of the brand. Once the positioning plan has been completed (and the company knows how it wants to present itself to the market with respect to its competition), the company implements a plan of action through the construction of a suitable marketing mix (Brooksbank, 1994). Companies that are able to communicate a certain meaning through the packaging and marketing of a product can create a competitive advantage in the market and increase the product’s chance of success (Lewalski, 1988; Bloch, 1995; Hertenstein, Platt, & Veryzer, 2005; Yamamoto & Lambert, 1994; Chang & Wu, 2007).

3.2 Customer Perception Theory

Customer perception is an important factor in understanding product positioning as it allows companies to closely align their products with the attributes most valued by their desired target market; resulting in a point of differentiation or competitive advantage (Grewal, Monroe, & Krishnan, 1998; Monroe & Chapman, 1987). It has been defined as the “perceptions about a

brand as reflected by the brand associations held in customer memory”(Keller, 1993).

Perception, or perceived quality, has an effect on customer purchasing factors such as perceived value, satisfaction, and brand loyalty (Hansen, 2005). When purchasing food products, selection choices are influenced more by psychological interpretation of a product rather than the physical properties of products themselves (Morris & Yeung, 2001). As companies aim to achieve and maintain value in the eyes of their customers, they must first understand how to analyze customer perceptions in the market.

3.2.1 Measuring Customer Perception

Traditionally, marketing researchers have utilized survey instruments and interview mechanisms to analyze customer perceptions (Cicia, Giudice, & Scarpa, 2002; Verbeke & Viaene, 1999). In the early 2000’s, Cicia, Giudice, & Scarpa conducted a survey study of customers perception of quality in organic olive oil where they found price, product origins, and certification labels to be the major determinant factors of organic olive oil quality in the eyes of customers. However, their study was limited as the logit model they utilized did not account for preference heterogeneity and taste-parameter fixity for choices made by the same customer (Cicia, Giudice, & Scarpa, 2002). Naspetti & Zanolli, 2002 conducted a similar study utilizing the laddering interview approach to observe customer motivations when purchasing organic food. Naspetti & Zanolli results showed that taste and nourishment was the primary factors customers searched for when buying organic products as pleasure and wellbeing were their most important values. (Naspetti & Zanolli, 2002) Although the traditional survey techniques provided great insight, they are limited in terms time, cost, and reliability of responses (John, Loewenstein, & Prelec, 2012; Moy & Murphy, 2016). Although there are ways to mitigate these limitations, an inverse relationship exists between response reliability and both time and cost.

3.3 Online Customer Review Analysis

Technological advancements of the internet have provided a new way of analyzing customer perceptions and purchasing behavior through online customer review analysis of products such as cameras, movies, restaurants and gaming consoles. Many studies have found customer reviews to be a major influence on online purchasing behaviors (Cui, Lui, & Guo, 2012; Dellarocas et al., 2003; Floyd, Freling, Alhoqail, Cho, & Freling, 2014; Zhu & Zhang, 2010). Studies such as Clemmons, Chevalier, and Zhu (year) utilized online customer reviews to analyze the positive relationship between quantitative aspects of customer review (volume, ranking, etc.) and product sales (Chevalier & Mayzlin, 2006; Clemons et al., 2006; Dellarocas et al., 2003). However, many of these trailblazing studies failed to analyze the actual content in the customer reviews, only utilizing the review rankings and overall attitude of the review (Chevalier & Mayzlin, 2006; Dellarocas, Awad, & Zhang, 2003; Zhu & Zhang, 2010). Although these studies examine customer perception of products by way of product rankings, some studies consider the rankings to be misleading as they may not necessarily reveal the customers true thoughts of the product (Davis & Khazanchi, 2008; Hu, Liu, & Sambamurthy, 2011; Hu, Pavlou, & Zhang, 2006).

3.3.1 Keyword Analysis Studies

Költringer & Dickinger decided to take online customer review analysis a step further and examine the qualitative information of customer reviews utilizing keyword analysis. Their objective was to identify the effect of the content in the reviews on purchasing, as well as compare and contrast marketed information and customer-produced information (Költringer & Dickinger, 2015). They found that the brand image amongst customers varied by online source. They also found that the online reviews had the highest amount of influence on customers as it

provided the most diverse source of information to their customers (Költringer & Dickinger, 2015). Similar to Költringer & Dickinger's approach, Yan, Wang, & Chau, 2015-combined regression and content analysis to analyze the relationship between customer satisfaction, restaurant type, and restaurant revisit intention using online customer ratings and reviews. The results found that all four dimensions have a positive relationship with customer revisit intentions and customer satisfaction. Of the four, service quality was the strongest influencing factor (Yan, Wang, & Chau, 2015). Although both studies added valuable insight to the understanding of customer review analysis and customer economics, they both experienced a similar limitations in terms of contextual assumption as the automated web content mining failed to accurately display the context use of the words in the content of the reviews (Költringer & Dickinger, 2015; Yan et al., 2015). However, effective utilization of the information generated from this type of analysis can be quite useful to company executives as the data incorporates free customer feedback on their opinions of company products and brands (Gensler, Völckner, Egger, Fischbach, & Schoder, 2015).

3.3.2 Pet Food Customer Perception Studies

There has been emerging research literature examining customer preferences and willingness to pay [a premium] for pet food with specific attributes (Fidler, Light, & Costall, 1996; Serpell, 1996; Zasloff, 1996). However, the methods described in this literature are modelled after similar studies in human food. Conclusions from these studies are limited since they appeal to the customer but not the pets who consume the product (Boya et al., 2015; Koppel et al., 2018). For example, (Koppel et al., 2018) researchers obtained customer product perception data from trained consumer panel tasting experiments focusing on taste attributes instead of product perception attributes such as packaging. In addition to capturing the wrong

attribute types, these methods have a tradeoff between sample size (validity) and the scope of the information studied; resulting in a problem with the quality of the conclusion of the research (Morse, 2000). Because of this, the previous literature has failed to address companies' ability to effectively communicate value to pet food customers through product packaging. To effectively market a product to customers in the pet food industry, companies must know what customers value and how their product is perceived.

3.4 Literature Review Summary

Overall, combining an understanding of product positioning, online customer review analysis, and user-generated review content analysis could provide a great meaningful approach to analyze the alignment of customer perceptions and company marketing strategies. The results generated might offer direct feedback for both strengths and weaknesses of a product and brand through the eyes of the customers (Gensler et al., 2015). Due to the limited amount of information regarding online customer review analysis, some may question the trustworthiness of the online customer review content serving as a representation of the perception of customers. However, Filieri attempted to address this concern in his 2016 study which found that cues such that “message content, style, review extremity and valence are all ways to assess the trustworthiness of the reviews” (Filieri, 2016). Although this may be the case, further research is needed to increase the knowledge and power gained from online customer review analysis and the implications which can be drawn in the pet food industry (Filieri, 2016; Költringer & Dickinger, 2015; Yan et al., 2015).

Chapter 4 - Conceptual Framework

Understanding how customers perceive the product offerings of a company is a crucial component of successful marketing strategy. Additionally, the company should be aware of ways they can alter their marketing strategy to accommodate customer demands. To accomplish this, it is important for a company to identify the similarities and differences of their marketed value and the value perceived by customers in order to ensure they are aligned. Customer Value (cv) is a function of the pricing (p) of a product and perceived benefits (pb). The model below details the relationship between value, price, and perceived benefit.

Figure 2. Customer Value Function

$$\text{Customer Value} = f(\text{price, perceived benefits})$$

$$cv = \frac{pb}{p}$$

As shown in the equation above, price is not the only factor in determining customer perceived value of a product. In many value markets where there are many companies present, product pricing is usually similar. In this case, there is a greater emphasis placed on the perceived benefit of the product, causing companies to differentiate based on product characteristics. The characteristics used are classified as means of differentiation.

Table 2. Means and Sources of Product Differentiation

		Means of Differentiation			
		Physical Change	Perceptual Change	Supply Chain	Associated Service
Sources of Differentiation	Form				
	Functionality				
	Quality				
	Place				
	Ease of Possession				
	Time				

The “means of differentiation” are the aspects of the product a company changes to increase the perceived benefits of the product. These means include physical change, perceptual change, associated service change, and supply chain change. For example, if a pet food company decided to change their package labelling from “chicken” to real chicken, the company creates a perceptual change through alteration of their message. Alteration of any of these means results in a change in the perceived benefits through the sources of differentiation. The sources of differentiation are the aspects of the product, which customers associate with perceived benefit. Sources of differentiation includes quality, functionality, form, place, time, and ease of possession. For the purpose of this research, place, time, and ease of possession will be excluded since they are largely the same for products analyzed (i.e. pet food). In the example above, the company’s source of differentiation through the perceptual change is quality. By adding the term real chicken to the product packaging, the company increases the value of the product in the minds of customers as customers now perceives the company is using higher quality chicken in the products. This can result in an increase in revenue from the specific product.

4.1 Three Circle Analysis

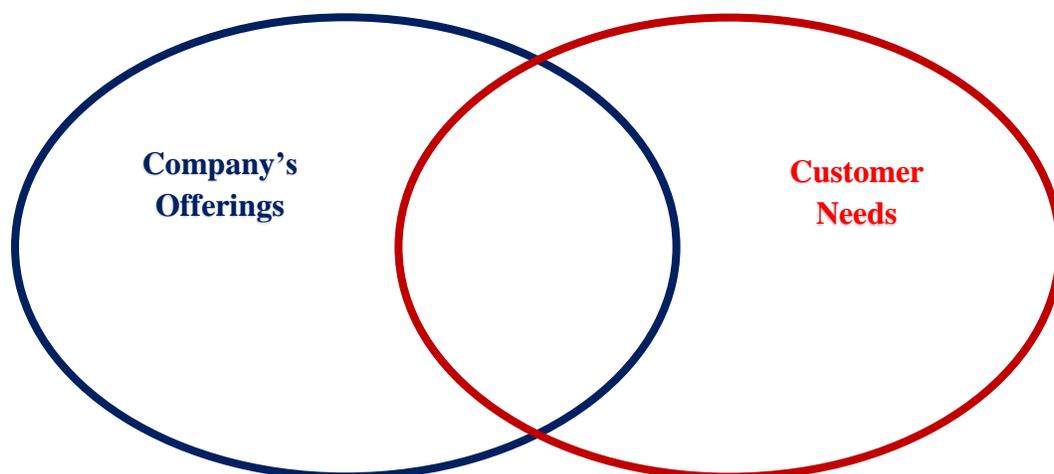
The three circle analysis is a simple yet powerful framework that provides helpful practical insights to inform product and marketing strategy decisions (Urbany & Davis, 2007). In doing so, the analysis shows the extent to which both companies are offering a similar value proposition that is appropriately perceived by customers, as well as the unique value propositions of each company, the unappreciated aspects of intended value proposition, and the unmet needs/unintended value perceived by customer. It is important for companies to understand the extent which customers perceive their product as similar to competitive products as it determines how close of a substitute the two products are (Brewer, 1991). If the products are perceived as close substitutes, any small shift in perceived value between the products can result in a large shift in customer preference for one product over the other (Wolter, Brach, Cronin, & Bonn, 2016). The three-circle framework provides great benefit as the information in the model helps companies to identify areas of their marketing strategy to adjust so they can increase the perceived value of their products, allowing them to capture a larger share of the market.

4.2 Previous Three-Circle Analysis Literature

The conceptual framework based on some variation of three-circle Venn diagram analysis has been used widely in previous literature. However, the application of this framework in the marketing strategy literature in general, and in the area of product differentiation in particular has been limited. Many researchers have utilized the framework in the medical and biology fields. (Martin et al., 2012) utilized a web application Venn Diagram to compare and contrast terms on a biological database (Martin et al., 2012). They also explained the use of different proportions sizes of the three circles as it relates to the times the circles were used. A

circle, which held the highest quantity of information, was the largest of the three and vice versa. Other studies such as Pirooznia, et. al. (2007), and Rodgers et. al. (2009), and Larsson & Gustafsson, (2018) also expounded on the use of proportionality of the circle sizes in the Venn Diagram (Larsson & Gustafsson, 2018; Pirooznia et al., 2007; Rodgers et al., 2009). Studies such as Foster (2009) and O'Brien (2018) used the three-circle model to display similarities between multiple regression analysis results (Foster, 2009; O'Brien, 2018). Although each of the previously mentioned studies varied in the use of the three-circle model, they all highlight the benefit of the model as it provides an easy and sound way to display comparisons between two or more subjects. Furthermore, the model can be applied to a wide variety of subject areas to display similarities and differences. Because of this, it is reasonable to expect that researchers can apply a marketing approach to the model in order to display potential product success and identify areas of improvement for current marketing strategies for a given pet food.

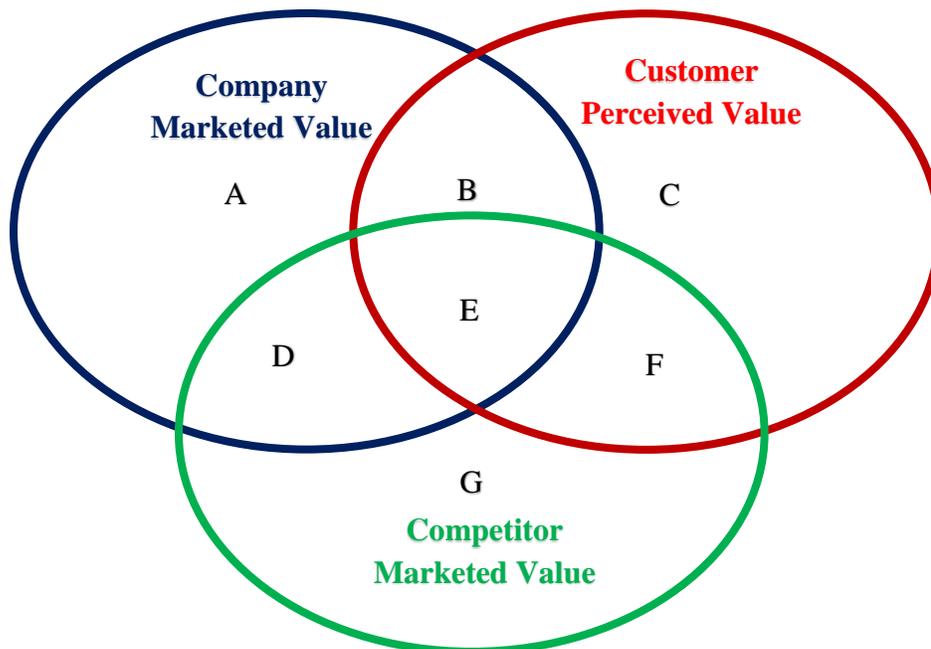
Figure 3. Company Offerings vs. Customer Needs Venn diagram Model



4.3 Model Description

The blue circle represents the company's offerings, or the marketed words [claims] of the company. The characteristics in this section are the characteristics that the company is trying to emphasize when positioning their products. The red circle represents the customer's needs and perceptions of value. The goal of the company is to increase the overlap of the red and blue circles, as this means the company is successfully marketing value in their product which customers need/perceive. Although almost impossible, a company's dream would be to perfectly overlap the two circles. This would show that the company is successfully marketing all aspect of the pet food customer demand. The green circle represents a competitor's offering. Similar to the blue circle, the overlap of the green circle and red circle means the company offers product attributes customers need/perceive.

Figure 4. Three-Circle Venn Diagram Sections



4.3.1 Sections A & B

As displayed above in Figure 6, there are seven sections of the three-circle model. Section A represents the value marketed by the company, but not perceived as value by the customer, and not marketed by competitors. Section B represents the characteristics marketed by the company, perceived as value by the customer, and not marketed by competitors. It is displayed by overlap of the first and second circles. Section B is a positive section at which the company is successfully positioning their product in the mind of customers and displaying their point of differentiation. The primary goal of the company is to increase this section as much as possible (Urbany & Davis, 2007).

4.3.2 Section C

Section C represents the characteristics not marketed by the company, perceived as value by the customer, and not marketed by competitors. Understanding aspects of unmet customer needs can be beneficial to a company as it details what the customers are looking for within a product. In many instances, the information which falls in this category are characteristics which the customers look for in the product which the company doesn't offer, or product characteristics which the company product does offer but do not market. However, in both instances, the company can benefit from this information. If there is a characteristic in which customers demand but the company's product does not offer, the company could change their product and marketing strategy to meet the demand of the customer; given that the cost of changing the product is less than the expected profit gained from the change. In addition, if the company offers a specific characteristic demanded by customers, yet the company does not market it; the company has the ability to change their marketing scheme to highlight this particular benefit of their product. In both scenarios, the company is presented with a chance to alter their current

product or marketing strategy to capture a larger customer base. In doing so, they will have the opportunity to increase their market share.

4.3.3 Section D

The information found in section D are characteristics marketed by the company, not perceived as value by the customer, and marketed by competitors. This section is considered to be the most wasteful section as both companies are competing against each other in a product characteristic area which the customers' do not consider to be valuable. However, due to packaging requirements and regulations, a majority of the information in this section is information which many customers do not care about, but the companies are required to incorporate into their packaging. Although this is the case, the marketing efforts for this category should be placed elsewhere if possible, to help the companies increase their competitive advantages.

4.3.4 Section E

Keywords in the overlap section of each of the three circles are terms or claims, which both companies are marketing and are valued by customers. This section displays the characteristics which both companies are successfully positioning themselves. In many instances, the primary characteristic the companies are competing in falls within this category. For instance, if two companies are competing in the dry dog food market, it is highly likely the term dry dog food would fall in this category; due to both companies marketing their products as such and customers perceiving the product this way. Although it is okay for a company to have the main product characteristic in this section, they should not want their primary points of differentiation falling into this category. If this occurs, then the point of differentiation is no longer considered a differentiating factor. This usually occurs when competitors incorporate a

popular differentiation point of a company into their own product. In doing so, the characteristic moves from section B to section E. Therefore, the primary goal of each of the companies should be to increase the overlap of their respective circles and the circle which customers' value, as this will increase their competitive advantage allowing them to increase their market share.

4.3.5 Sections F & G

Section F represents attributes/characteristics not marketed by the company, valued by customers, and marketed by the competitor. This section is great for competitors as it gives them competitive advantage over the company. If customers heavily demand the characteristics in this section, the company should incorporate the characteristic into their product to capture a piece of the market share. In doing so, the characteristic would move from section F to section E. Section G displays the information not marketed by the company, not valued by customers, but marketed by the competitor. Similar to section A, the characteristics in this section can be beneficial to the competitor company if they can position the characteristics as valuable in the mind of the customers. In doing so, the characteristic would move from section G to section F.

As previously mentioned, the primary goal of a company is to increase Section B (the company's current point of differentiation) of the three-circle model as this section represents their point of differentiation. As the size of section B increases, the amount of advantage over competitors.

Chapter 5 - Data

5.1 Justification for using Online Customer Reviews

Furthermore, the study analyzes the frequency of keywords used by customers in online reviews and company's product description to identify similarities and differences. Pet food customer perceptions of product characteristics are necessary to understand the success of marketing strategies in the pet food industry. However, the pet food industry has drawn little attention from marketing researchers. As a result, there are little to no studies published [in the peer reviewed literature] on pet food customer perceptions. Existing studies of the pet food industry analyze pet owners and their relationships with their pets, product nutrition, and pet owner sensory analysis of pet food; instead of the packaging which is a primary factor in purchasing decisions (Fidler et al., 1996; Koppel et al., 2018). Moreover, the existing information about pet food customers is beneficial in determining willingness to pay for products; yet it does not provide sufficient insight regarding how the customers feel about the product characteristics. In addition, it also fails to address the current positioning strategies of pet food companies relative to their success. With the increase in online pet food purchasing there is a set of data detailing the viewpoint of customers about current products in the market. However, the specificity of the data requires a tailored systematic approach to collect and analyze for valuable insight.

The use of online customer reviews is justified by its low cost, large population size, and scope of information provided. Customer reviews are revealing resources providing advantages for both potential customers and pet food companies (Somprasertsri & Lalitrojwong, 2010). The task of manually scanning through large amounts of reviews one by one is computational burden and is not practically implemented with respect to businesses and customer perspectives. The

reviews are written in ordinary language and therefore it is more efficient to automatically analyze the reviews and provide the necessary information in a suitable form. With proper analysis, the review data addresses how to determine the sentiment, attitude or opinion that a customer feels in natural language text as it relates to a certain feature.

5.2 Products Utilized in the Study

Table 3. Data Summary Table

Products	Data Type	Data Source	Product Ranking	Customer Satisfaction
Purina One Natural Smart Blend	Company Product Description Data	Amazon.com	5-Star	Satisfied Customer
		Chewy.com	4-Star	
Blue Buffalo Life Protection Natural Formula	Online Customer Review Data	Petco.com	3-Star	Indifferent Customer
		Walmart.com	2-Star	Unsatisfied Customer
		Purina.com	1-Star	
		BlueBuffalo.com		

5.2.1 Product Characteristics

Dry dog food was selected as the pet food product to be analyzed for this study. As proven by the pet food market share and large sales numbers, dry dog food is the most demanded product amongst all pet food products. In 2017, dry dog food sales accounted for \$13.06 billion (63%) of the \$20.8 billion U.S. dog food sales (Passport, 2017b). In addition, market analyst have found that innovation in pet food usually begins with the dog food products (Mintel Group Ltd, 2016). In terms of product attributes, natural and grain free products have been the

predominately demanded product attributes in this sector. Animal based proteins such as chicken, beef, and lamb have been the primary meats demanded in the market. However, chicken has been the most demanded of the three. To support the primary demanded attribute characteristics highlighted by market analysts, the researchers in the current study implemented a keyword frequency count of the top 50 most demanded pet food products by Amazon customers. Of the 50 products, “natural” and “chicken” were the most commonly demanded attributes accounting for 50% and 34%, respectively. Surprisingly, rice-based products were the third most demanded product outpacing grain free products with 28% demanded versus 24%, respectively. Because of this, in the current study it was decided to analyze pet food products with natural, chicken, and brown rice attributes.

5.2.2 Brand / Companies Products

Nestle Purina and Blue Buffalo were two companies selected for the purpose of this study. Both companies were selected as they fit the desired criteria listed below:

1. Ranked in the top 10 companies for global pet food sales
2. Offered a brand ranking in the top 10 pet food brands on Amazon
3. Offered a dry dog food product-containing natural, chicken, and rice ingredients.
4. Had at least 1,500 online product reviews by customers in the four selected websites.

Figure 5. Purina One Smart Blend & Blue Buffalo Life Protection Formula Product Packages



Nestle Purina was ranked 2nd amongst all global pet food companies in 2017 and 1st in dry pet food sales. In addition, Nestle Purina also ranked 2nd of the 2018 top pet food brands sold on Amazon, and was the leading producer of dry dog food products. Blue Buffalo, on the other hand, ranked 6th among the global pet food pet food companies in sales. Blue Buffalo also ranked first on the list of top pet food brands on Amazon in 2018. Purina One Smart Blend was the specific Nestle Purina brand used for the study, as this is a Nestle Purina natural dog food brand. In contrast, Blue Buffalo only operates in the natural product market, meaning all the products they offer are considered natural products. Blue Buffalo Life Source Adult Blend was the Blue Buffalo product used in this study.

5.3 Data Type

There were two types of data collected and analyzed in this study: product description data, and online customer review data. Product description data represents the information the two companies were marketing to customers. In both products, the product description section highlighted the key product features on which the companies were trying to position their products. Each of the four product characteristics (dry, natural, chicken, rice, adult) were mentioned in this section for both products. Online customer review data represents the information customers were mentioning about the product. The higher the frequency of a characteristic, the more the customer perceived value if they ranked the product as five or four stars. Alternatively, the high frequency of the word in the one, or two stars review were likely to indicate product dissatisfaction related to that factor. Product data and online customer review data were collected for both the Purina and Blue Buffalo products. For the purpose of this study, product description data represented the companies' current positioning strategy and the online customer review data represented the customer perception of the product post-purchase.

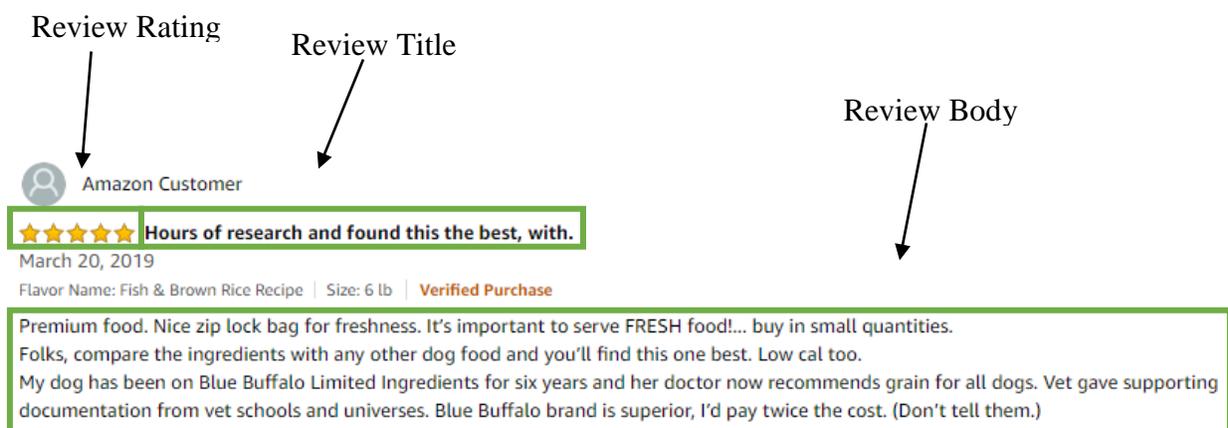
5.4 Data Sources

The online customer review and product description data were collected from six different websites. These websites included Amazon.com, Chewy.com, Petco.com, and Walmart.com, Purina.com, and Bluebuffalo.com. Both customer and product description data were collected from all websites except Bluebuffalo.com. Only product description data was collected from Bluebuffalo.com as the company website did not have a section for customer product reviews. Amazon.com, Chewy.com, Petco.com, and Walmart.com were selected for customer reviews as these were four of the top five online pet product retailers in the U.S. in 2017(Statista, 2018).

5.5 Review Characteristics

There were three components of the online customer reviews analyzed in this study. First, the review rating was used to determine the customers' satisfaction with the product post purchase. Each customer who left a customer review was required by the online platforms to rank the product based on their personal perception. The customer rated the product by a selecting the amount of stars which they felt best matched their opinion of the product. The ratings ranged from 1-star to 5-stars, 1-star being the worst and 5-stars the best. An example of a customer product review rating is shown below in Figure 5. Reviews containing 1-star and 2-star ratings were considered unsatisfied customers, while 4-star and 5-star customers were considered satisfied with their purchase. For the purpose of the three-circle analysis, unsatisfied reviews and three-star reviews were omitted. The researcher was only interested in the linkage between the attributes mentioned by the two companies and their satisfied to prevent dependency on contextualization. Three-star customers are considered indifferent, as they are neither satisfied nor unsatisfied with the products.

Figure 6. Amazon Customer Review Example



The second review component utilized was the review title. In many reviews, the review title briefly detailed the customers feeling toward the product. However, the information provided in the review title varied by customer. For example, the review title shown above in Figure 3 states that the customer liked the product. This is also displayed by the 5-star product rating. In other reviews, the title may detail information regarding the pet's reaction to the product; many of which expressed that their pet loved the product. No matter what information was provided in the review title, it was included in the review title data as some of the information provided may not have been provided in the main review body portion. In the review body, customers provided a detailed description of their perceptions of the product. Information provided included: experience, packaging, likes and dislikes, competitor product comparisons, and repurchase intentions. The review body was used to determine which keywords customers highlighted the most to determine their most valued characteristics. This is the primary section in which the keywords were collected and analyzed.

5.6 Review Distribution

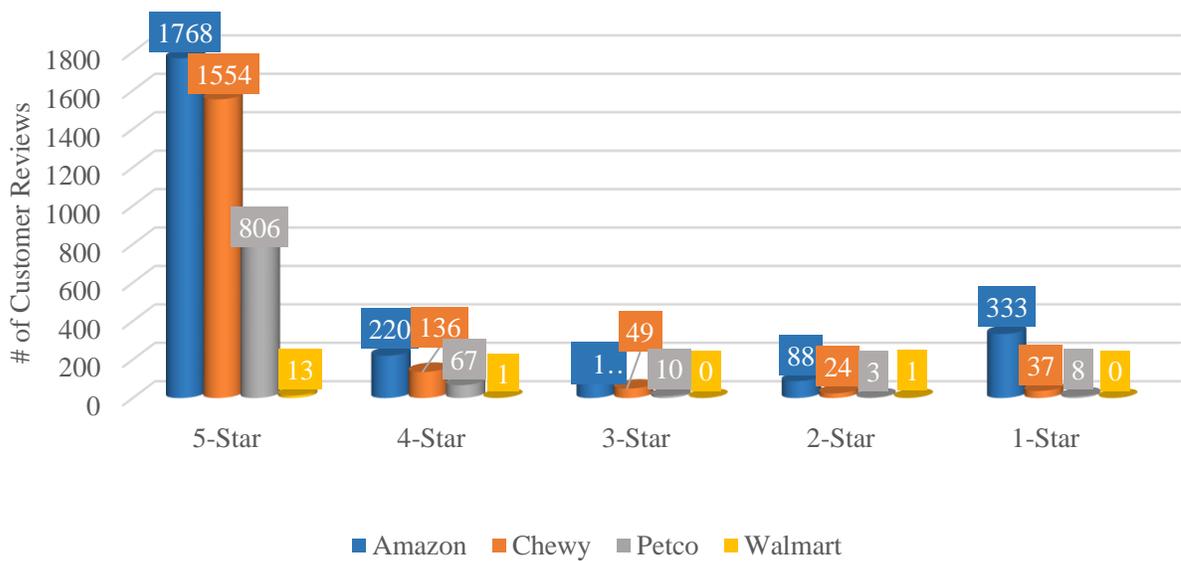
The online customer review sample analyzed in this study totaled 8,419 customer reviews. Blue buffalo customer reviews represented 62% of the total number with 5,235 reviews. Nestle Purina had 3,184 customer reviews, accounting for 38%. Pre-data analysis shows that Blue Buffalo had more customer reviews in all product ranking categories than Nestle Purina. In addition, Blue Buffalo also had almost double the amount of 5-star reviews compared to Nestle Purina's 5-star reviews. In terms of customer satisfaction, Nestle Purina had a 92% customer satisfaction rate (percentage of satisfied customers in reference to total number of customers) which was 5% higher than Blue Buffalo's 87%. Amazon.com and Chewy.com had the largest number of online customer reviews for the Blue Buffalo product accounting for 83%.

Amazon.com and Walmart.com were the top online customer review cites for the Nestle Purina products as they accounted for 63%. Overall, Nestle Purina displayed a more balanced distribution of reviews across the online websites than Blue Buffalo.

Figure 7. Nestle Purina Online Customer Review Distribution by Website & Product Ranking



Figure 8. Blue Buffalo Online Customer Review Distribution by Website & Product Ranking



5.7 Data Count Type

There were two different count types used to analyze the textual data. First, a word frequency count to show how many times a word was used throughout the text data. The total word frequency of a word is equal to the sum of the total number of times the word appears in the text. For example, if there were three customers who used the word “dry” two times each in their reviews, the word frequency count for “dry” would be six. The count was applied to both product description data and online customer review data. It helped distinguish between the most frequently used words and the least frequently used words by the companies and customers. The second count applied was a customer frequency count. The customer frequency count shows how many customers used a word in the text data, detailing the word used by the highest number of customers. The customer count was equal to the number of customers who used a word. In the example of the three customers using the term “dry”, although the word frequency is six, the customer count is three as there were only three customers who used the term “dry.” Customer count was only applied to the online customer review data as the product description data was only mentioned from the perspective of the company. As a result, the customer count for the product description data is one. It is beneficial to analyze both the word frequency and the customer count to see the difference between the most frequently used word and the word used by the greatest number of customers. One would expect the two to mirror each other as this would imply the most frequently use words were those the two companies attempted to position themselves with customers perceive value.

5.8 Product Attribute Categories

Product attribute categories were used to identify the specific type of attributes companies try to position themselves. It is also used to identify the words customers mention

most. Great care was used in grouping the words into attribute categories to prevent contextualizing the data. There were 16 total attribute categories (Table 6). The words were placed into the category which best fit the criterion of the categories. Many of the attribute categories used are self-explanatory. For example, any type of dog breeds mentioned will go into the breed category; words describing smell will be placed into the smell category, etc. However, other categories may need a little more explanation.

Table 4. Pet Food Product Attribute Category Breakdown

“Category	Description	# of Words	Attribute %	Source of Differentiation	Means of Differentiation
Appearance	Any word, which describes a physical feature of the product observed by the naked eye.	13	1%	Form	Physical change Perception change
Breed	Any word to describe the breed of the animal.	134	13%	Functional	Physical change
Form	Any word to describe the physical shape of the product.	32	3%	Form	Physical change
Health / Benefit	Any word to describe the physical health or health related benefits of the product.	279	28%	Functional	Physical change Perception change
Ingredient	Any word to describe an input ingredient used in the product.	168	17%	Quality Functional	Physical change Perception change
Natural	Any word to describe the natural characteristics of a product.	2	0%	Quality Functional	Perception change Supply Chain change
Other	Any words which does not fit the criterion of any of the other categories.	117	12%	N/A	N/A
Organic	Any word to describe the organic processing characteristics of a product.	1	0%	Quality Functional	Supply Chain Change Perception change
Packaging	Any words to describe the packaging of the product.	44	4%	Form	Physical
Price	Any words to describe the price of the product.	33	3%	Price	Price
Processing	Any words to describe the process of how the product was made.	71	7%	Quality Functional	Physical change
Smell	Any words to describe the smell of the product.	13	1%	Form	Physical change Perception change

Sourcing / Location	Any words to describe the origin, location, or source of the production of the product.	45	5%	Quality	Supply Chain change
Taste	Any words to describe how the product taste.	13	1%	Quality	Perception change
Texture	Any words to describe the chemical composition or feel of the product.	28	3%	Form	Physical change

The health/benefit category consisted of all words used to describe the health, whether it be a body part or body feeling; and benefit which was the ability to heal or prevent disease. For instance, words such as leg, stomach, stomachache, fur, joints, etc. were placed into the health/benefit category. The ingredient category consisted of words referring to any raw materials used to produce the pet food product. Words such as chicken, vegetables, vitamins, etc. were placed into this category. The processing category consisted of all words describing the process of how the product was made. For instance, words such as freeze-dried, refrigerated, cage free were assigned to this category. The categories were analyzed by count and percentage breakdown to see which attributes were used most frequently.

5.9 Data Extraction

The online customer reviews were collected from websites such as Amazon.com, Chewy.com, Petco.com, and Walmart.com. These were four of the top five online pet product retailers in the U.S. in 2017(Statista, 2018). The body content of the reviews was extracted from the online sites using the R statistical software. R version 3.5.3 was used through the R Studio platform. To ensure extraction of only customer reviews, the CSS code for the customer reviews were incorporated into the r coding. The primary R-packages utilized in this extraction and mining codes were the “rvest”, “RSelenium”, and the “xm12” packages. Extraction from the Amazon and company websites was uncomplicated and a loop function was incorporated to read

multiple pages of the product reviews on each page even though they had a similar yet different URL. For example, a product on the amazon website may contain eight pages of reviews with URL's containing the same content except the number at the end of the URL denoting the product review page. By utilizing the loop function in R, it was possible to write a code to read the URL with a loop from one to eight at the end of the URL. In doing this, the software read the same URL eight times only varying the last digit of the URL from one to eight.

Collection of data from Walmart, Chewy and Petco, on the other hand, posed a greater level of difficulty due to the use of JavaScript on these websites. This required use of the “rvest”, and “RSelenium” packages to extract the review data. Unlike the multiple pages of product reviews on Amazon and the other websites, the multiple pages of the Walmart reviews contained the same URL. Meaning, that if the product review page was changed the URL remained constant. Because of this it was possible to alter the code used for the other websites as the first page of the Walmart site was the only page in which R was able to read. Using the “rvest”, and “RSelenium” packages in R, it was possible to manually construct R in order to change the product review page and read each page before changing to the next. More specifically, R would open a web browser and go to the product review page, extract the reviews from the first page, automatically select the second page with the cursor to extract the reviews from the next page. This cycle continued until all review pages were mined into the R software. For organizational purposes, all extraction codes were written to group each product review by product name, product rating, and the site from which the review was retrieved.

5.10 Data Cleaning

After extraction of the data, a text mining function, which broke each review into individual words (raw text data), was incorporated into the code. Within the mining function,

numbers, punctuation, spaces, pronouns and other meaningless words were removed from the raw text. The raw text was then transformed to lower case for ease of grouping. Next, a code grouping meaningful combination words was incorporated to connect words such as “grain” and “free” together when they are side by side in that order within the review to output “grainfree.” Verb tense endings were removed, and common words were combined into one word to provide an accurate frequency count of the words used. For example, words such as bak and bake were combined into bake, as bak is the result of the ed ending being removed from baked. Finally, an automated word frequency count was applied to the raw data and placed in descending order.

Chapter 6 - Analysis

6.1 Keyword Analysis

6.1.1 Keyword Categorical Analysis

Once the data was cleaned, a seven-step categorical analysis plan was implemented to analyze and draw conclusions. Text categorization is a key tool utilized in much keyword analysis to increase the understanding of qualitative data (Azam & Yao, 2012; Shang et al., 2007). The main goal of text categorization is to group natural language text to identify the most common types of text amongst qualitative data. This approach has been used in a wide range of research areas such as customer relationship management, web page classification, astronomy, and many other textual and document frequency analysis (Azam & Yao, 2012; Hassaine, Mecheter, & Jaoua, 2015; Qi & Davison, 2009; Sakkis et al., 2003). In each of the studies, researchers developed multiple categories based on the type of data analyzed. Text categorization has been credited as a great accommodation of keyword frequency and text mining analysis (Költringer & Dickinger, 2015; Park et al., 2016). Because of this, the a seven-step categorization method was applied to gain a better understanding and interpretation of the data.

As previously mentioned, a seven-step categorical analysis was applied to the data. First, five primary product attribute characteristic base categories were developed. The categories consisted of Ingredient, Function, Production, Packaging, and Sensory. The purpose of these base categories was to identify what type of characteristics of a product attribute are customers valuing and companies marketing the most. In the second step, all words were placed into the five categories. For example, words such as natural and grain free were placed into the ingredient category, whereas soft and frozen would be placed into the sensory category. In step 3, a

percentage breakdown by category was conducted on the customers as a whole, each company, each product review rating group, and customer satisfaction group. This step provided valuable insight into the general breakdown of the most valued and marketed characteristics. Step 5 consisted of further breaking of the base categories into subcategories. For instance, the Ingredient category was broken into processing and input; Function was broken into internal and external; sensory into texture, taste, and smell; and packaging into size, and type. By doing this, the researcher was able to get a better understanding of the most valued and marketed characteristic subcategories of the product attributes. Step 6 closely resembled step 3 as the same process was conducted for the subcategories. The final step consisted of the overall analysis of the previous six steps, comparing the breakdowns between both companies, combined company vs combined customer, review rating vs review rating, and satisfied vs. unsatisfied.

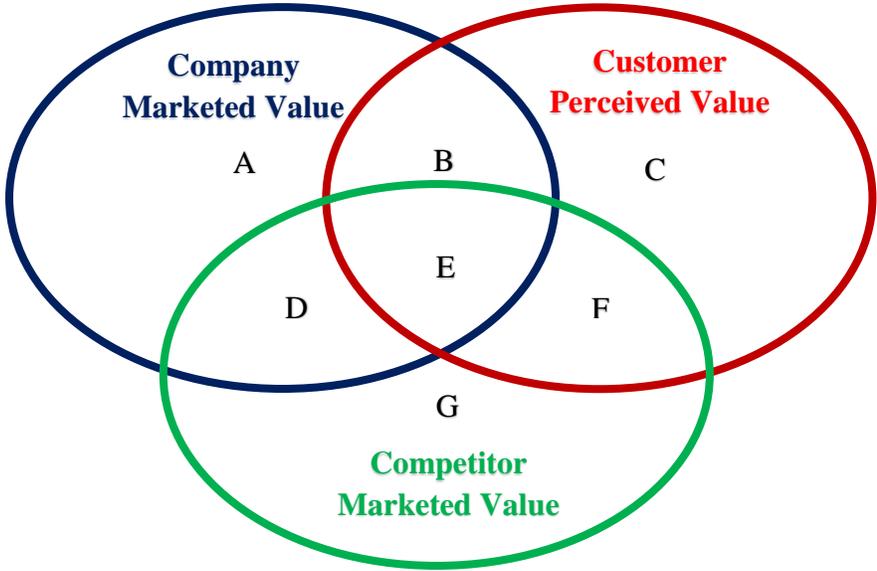
6.1.2 Keyword Frequency Analysis

Following the automated word frequency count, a keyword frequency analysis was conducted to identify the most frequently used words by the two companies and the customers. In this analysis, the words used by each company and customer were placed in separate tables in descending order from the largest frequency count to the smallest. The words were then examined to see which words were used most. This was applied to each customer group, company, satisfaction group, rating group, website responses, as well as categorical and sub categorical groups. Once completed, each company, group, and customer results were compared for similarities and differences. This comparison was needed to identify if the most popular words used by each company were the most popular words used by the customers. If this was true, the company was successfully positioning their products in the mind of the customers. In other words, the main characteristics, which the companies were highlighting about their product

to the customers, were the main characteristics the customers perceived as value. In doing so, the company can increase brand loyalty and the chances of product repurchasing; which in turns leads to increased profits.

6.2 Three-Circle Analysis

Figure 9. Three-Circle Venn diagram Sections



The three-circle analysis brings all the previously mentioned analysis together in one visualized model. All keywords used by both companies and customers were placed into their respective sections. For the purpose of this paper, only the top five keywords used by customers and each company were placed into the model below. To display the difference between frequencies of the words used, the font size of each word based on the number of times it was varied by each group. For instance, if natural was the most frequently used word by the customer and it was only used by the customer, it would be placed into section C of the three-circle model.

In addition, it would have the largest font size of the words used by the customers. In contrast, if the customer and the company used the word natural, it was placed into section B of the three-circle model. In this scenario, the font size of the word natural would display the ranking of the word used in contrast to the other words in each respective circle. For example, if natural was the most frequently used word by the customer but the third most frequently used word by the company; it was the largest word in the customer (red) circle and the third largest word in the company (blue) circle. However, the purpose of the difference in font size is to show the differences for times a word was used in each respective circle. The font sizes does not correlate between circles. In other words, although a word may be larger in the customer circle than the company circle, it does not mean it was used more times by the customer than it was by the company.

The model results showed how well the company's primary marketing focus ranked in terms of the words valued by the customer. As previously mentioned, the primary goal of a company is to expand their point of differentiation (section B of the model). In doing so, this means they are increasing the value of their product in the eyes of the customer as it relates to competitor products. In addition, the company also aims to ensure their primary positioning strategy is both valued most by the customer and perceived by the customer as a point of differentiation. The model will display if the company is successfully achieving this. For example, if the largest word (in terms of font size) in the company (blue) circle is placed into the overlap of the company and customer circle (section B), this shows that the company is successfully positioning their primary marketed product characteristic as a point of differentiation in the minds of the customer. In addition, if the largest word in the company circle is the largest word in the customer circle, the company's point of differentiation is valued most

by the customer. In addition, a word found in section B (the company's point of differentiation) of the model that is greater in font size than a word found in section F (the competitor's point of differentiation); this means the customer mentioned the point of differentiation by the company more than it mentioned the competitor's point of differentiation.

Overall, the three-circle analysis of the data provided insight into the company's ability to successfully position its product in the mind of the customers in relation to competitor products. The results displayed in the following section will detail the insight gained from the analysis and the ways the company can adjust its marketing strategy to capture a larger share of the product market through proper alignment of the characteristics, which the customers value most.

Chapter 7 - Results

This chapter reports the results relative to the objectives of this study. The results were limited to the top twenty words with the highest customer count and word frequency amongst customer reviews and company product descriptions. Discussion of the customer review results are/were based on the company and customer satisfaction. The Three-circle Venn diagram results are also discussed in detail, as this was the primary analysis used to achieve the research objectives and visualize the similarities and differences between communicated and perceived attributes.

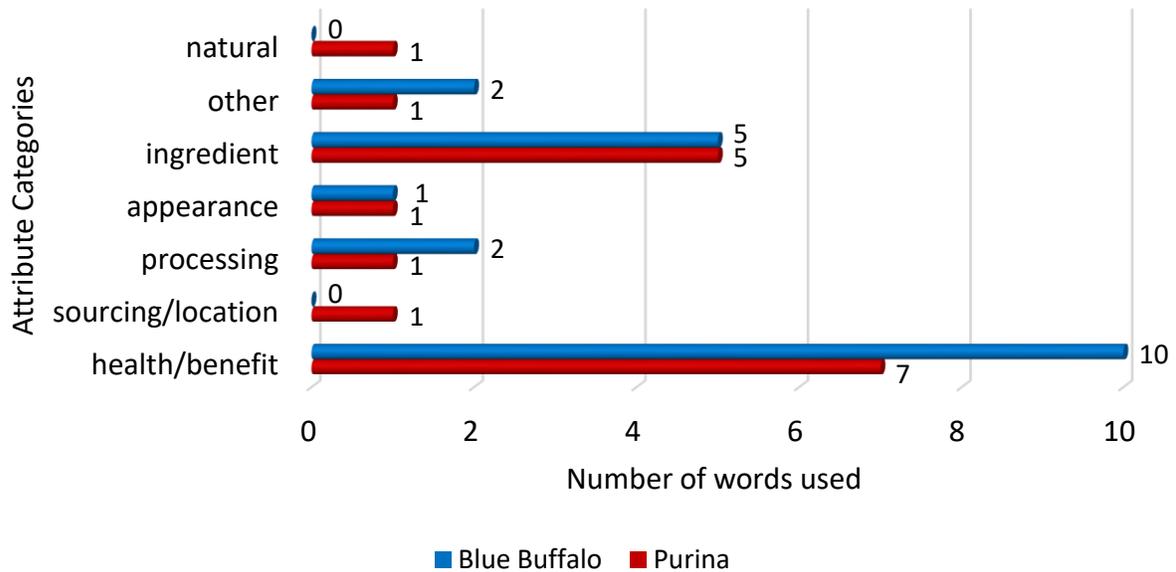
7.1 Objective 1 Results

Examine the attribute-based differentiation strategies pet food companies' use to position specific pet food products in the market.

7.1.1 Company Product Description Breakdown by Category

Data to address objective one was collected from the company product description. The results indicated that both companies' market many of the same attributes of their products to customers. Of the sixteen attribute categories, both companies placed their primary marketing focus on five attributes: appearance, health/benefit, ingredient, processing, and other. However, Blue Buffalo only marketed words pertaining to the five attributes. Nestle Purina incorporated words in the natural and sourcing / location attribute categories. Most notably, health / benefit was the primary attribute marketed by both pet food companies.

Figure 10. Company Product Description Attribute Category Word Frequency Results



About 50% of the words mentioned in the product description for both Blue Buffalo (55%) and Nestle Purina (47%) were related to the health / benefit of the pets. This is a rather interesting finding as the companies must be cautious when marketing these attributes to prevent from advertising health claims against FDA[AAFCO] labeling regulations. However, after examining the product descriptions, it is apparent that both companies are attempting to couple the health / benefit attributes with the ingredient associated with a particular benefit. For example, instead of Purina directly stating their product improves joint health; they highlight the natural source of glucosamine in their product, which helps support joint health. In doing so, Purina clearly communicates the benefit of their product on the joint health of the pets, all while staying within FDA regulations. Therefore, it is not surprising that both companies second most marketed attribute was the key ingredients in their respective products. In Nestle Purina’s product description, 24% of the attributes mentioned were ingredient attributes. Blue Buffalo’s

focus on ingredient attributes was similar with 20% of their attributes mentioned were ingredient-based attributes.

The data infers that Blue Buffalo has a slightly narrower attribute marketing approach than Purina. Excluding health/benefit and ingredient attributes, Nestle Purina mentioned only one word in each of the other five categories (appearance, natural, processing, sourcing/location, and other); each representing 6% of the marketed attributes. However, Blue Buffalo mentioned both the other? and processing attributes twice and the appearance attribute only once, representing 5% of their marketed attributes.

Table 5. Product Description Attribute Breakdown by Company

Attribute	Purina (N=17)	Blue Buffalo (N=20)
Appearance	6% (1)	5% (1)
Breed	-	-
Form	-	-
Health / Benefit	47% (8)	55% (11)
Ingredient	24% (4)	20% (4)
Natural	6% (1)	-
Other	6% (1)	10% (2)
Organic	-	-
Packaging	-	-
Price	-	-
Processing	6% (1)	10% (2)
Smell	-	-
Sourcing / Location	6% (1)	-
Taste	-	-
Texture	-	-

**N = number of words mentioned in the product description*

7.1.2 Company Product Description Breakdown by Word

There were similarities and differences in the words, which both companies mentioned in their product descriptions. As shown in tables 8 and 9 below, Blue Buffalo had more words in their product description than Nestle Purina. Blue Buffalo has 55 meaningful words they are marketing to customers in their product description; whereas, Nestle Purina had 17 meaningful words. Although there is a large gap between the numbers of meaningful words used by the two companies, 71% of all the meaningful words mentioned by Nestle Purina in their product description were also mentioned in the Blue Buffalo product description. The words mentioned in both lists were marked with an asterisk in the tables below. Only eight of the twelve total commonly used words are displayed in the tables below, as they were not in the top 10 frequently used words in the Blue Buffalo product description.

Table 6. Blue Buffalo Product Description Results

Rank	Word	Attribute	Freq	Freq.%
1	Healthi*	health/benefit	6	7%
2	Chicken	ingredient	5	6%
3	Lifesourc	other	4	5%
4	Health	health/benefit	3	4%
5	Immun	health/benefit	3	4%
6	Antioxid	ingredient	2	2%
7	Balanc	processing	2	2%
8	Blend*	processing	2	2%
9	Blue	other	2	2%
10	Bone	health/benefit	2	2%
11	Coat*	appearance	2	2%
12	Energi	health/benefit	2	2%
13	Ingredi*	ingredient	2	2%
14	Joint*	health/benefit	2	2%
15	Meal	ingredient	2	2%
16	Muscl*	health/benefit	2	2%
17	Protein*	health/benefit	2	2%
18	Skin*	health/benefit	2	2%
19	Teeth	health/benefit	2	2%
20	Acid	ingredient	1	1%

The word “healthi” was the most frequently used word in both companies’ product descriptions. Blue Buffalo used the term “healthi” 7% of the total amount of words used. This result is expected as the company is attempting to appeal to the health-conscious customers. They also highlighted many words associated with the benefit of the product on the health and different body parts of the animals. These words included immune, bone, energi, joint, muscl, skin, and teeth. Chicken was the second most mentioned word by Blue Buffalo. The primary aspects of their chicken being highlighted in the product description is the fact that their product contains real chicken and does not contain chicken by-products. Other words mentioning ingredient-based attributes were the actual word ingredient and acid. The acid mentioned were

referring to the omega three and 6 fatty acids in their product to promote shiny coat and healthy skin. Words such as life-source and blue had a 2% frequency percentage, ranking them in the top 10-word frequencies used in Blue Buffalo’s product description.

Table 7. Nestle Purina Product Description Results

Rank	Word	Attribute	Freq	Freq.%
1	Healthi*	health/benefit	3	15%
2	Source	sourcing/location	2	10%
3	Blend*	processing	1	5%
4	Coat*	appearance	1	5%
5	Digest	health/benefit	1	5%
6	Glucosamine*	ingredient	1	5%
7	Heart	health/benefit	1	5%
8	Highqual*	other	1	5%
9	Ingredi*	ingredient	1	5%
10	Joint*	health/benefit	1	5%
11	Muscl*	health/benefit	1	5%
12	Nature*	natural	1	5%
13	Nutrit	health/benefit	1	5%
14	Omega*	ingredient	1	5%
15	Protein*	ingredient	1	5%
16	Realchicken	ingredient	1	5%
17	Skin*	health/benefit	1	5%

The term “healthi” was the most frequently used in Nestle Purina’s product description. They used the term 15% of the total amount of words used. Although Purina had a lower word frequency for the term “healthi” than Blue Buffalo, the word frequency percentage was higher for Purina as they had a lower total amount of words used in the product description than Blue Buffalo. However, like Blue Buffalo, Purina is attempting to appeal to the health-conscious customers. They also highlighted many words associated with the benefit of the product on the health and different body parts of the animals. These words included: “immune”, “bone”, “energi”, “joint”, “muscl”, “skin”, and “teeth”. Chicken was the second most mentioned word by

Blue Buffalo. The primary aspects of their chicken being highlighted in the product description is the fact that their product contains real chicken and does not contain chicken by-products. Other ingredient-based attributes words mentioned were the actual term “ingredi”, “glucosamine”, “omega”, “protein”, and “realchicken”. The “omega” mentioned were referring to the omega three and 6 fatty acids in their product to promote shiny coat and healthy skin. The terms “healthi” and “source” made up 15% and 10% respectively of the total number of words mentioned in Purina’s product attributes. Each of the remaining words mentioned by Purina showed a word frequency percentage of 5% and a word frequency of one.

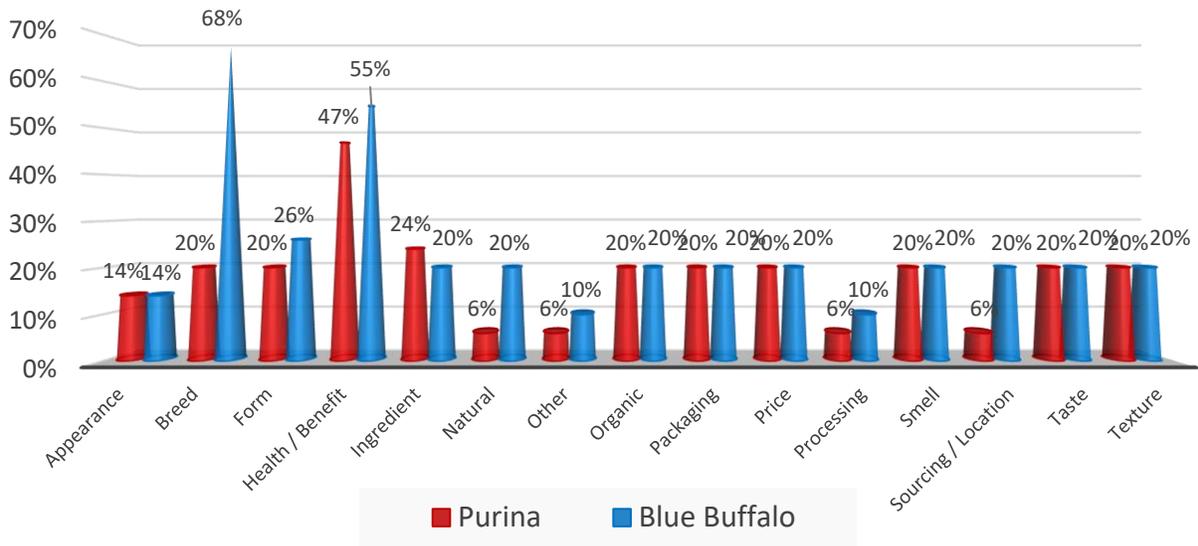
7.2 Objective 2 Results

Examine customers’ post-purchase perception of value derived from various attributes of specific pet food products.

7.2.1 Online Customer Review Attribute Category Results by Customer Count

Data to address objective two was collected from Blue Buffalo and Nestle Purina online customer reviews. Customer count results will be analyzed in this subsection. The results indicated that customers for both products perceive many of the same attributes of the products as value. Although the scaling size of the results varied, the distribution of customer counts across the attribute categories for both product customers seem to somewhat mirror. Of the sixteen attribute categories, both company customers place their primary value on health/benefit and ingredient attributes. Most notably, these are two of the top characteristics highlighted in the product descriptions of both companies. It can be inferred that both companies were successfully marketing the value of their health/benefit and ingredient attributes, as customers successfully perceive these benefits as value.

Figure 11. Online Customer Review Attribute Category Results (By Customer Count)



The results also indicated that health/benefit is the primary characteristic valued by customers, as it was the most frequently used attribute category amongst all customers for both products. This result was expected to be the most valued characteristic due to the expansion of the premiumization trend. Dog breed related attributes were the third highest attribute mentioned by both customers. Many of the words mentioned in the category were actual dog breeds such as “bull-dog”, “German Shephard”, “rottweiler”, etc.

Table 8. Online Customer Review Customer Count Attribute Breakdown by Company

Attribute	Purina (C=3,184)	Blue Buffalo (C=5,235)
Appearance	14% (392)	14% (452)
Breed	20% (2,698)	68% (3,579)
Form	20% (1,057)	26% (1,361)
Health / Benefit	47% (7,129)	55% (11,060)
Ingredient	24% (3,684)	20% (6,015)
Natural	6% (1)	20% (4)
Other	6% (2,665)	10% (3,923)
Organic	20% (4)	20% (4)
Packaging	20% (1,264)	20% (1,839)
Price	20% (1,046)	20% (1,493)
Processing	6% (1,568)	10% (2,588)
Smell	20% (301)	20% (555)
Sourcing / Location	6% (892)	20% (1,313)
Taste	20% (283)	20% (565)
Texture	20% (744)	20% (1,025)
<i>*C = sum of number of customers who mentioned words in the customer reviews</i>		

7.2.2 Online Customer Review Keyword Results by Customer Count

The word “symptom” was the term used by the highest amount of Blue Buffalo online customer. The term had a customer count of 137, inferring that of all words mention by Blue Buffalo customers, they associate the term “symptom” with the Blue Buffalo Life Source product. It can be inferred that the customers are referring to the symptoms, which the animal is showing, and the products ability to clear or treat the symptom. Weight was the second highest number of customers to mention the term amongst Blue Buffalo customers. This characteristic is notable to highlight, as the purchase healthy weight products has been on the rise over the 5-year span from 2014-2018. Customers also highlighted many words associated with the benefit of the product on the health and different body parts of the animals. These words included digest, fir, allerg, back, hip, and rib. Chicken was the second most mentioned word by Blue Buffalo. The primary aspects of their chicken being highlighted in the product description is the fact that their

product contains real chicken and does not contain chicken by-products. Other words mentioning ingredient-based attributes were the actual word ingredient and acid. The acid mentioned were referring to the omega three and 6 fatty acids in their product to promote shiny coat and healthy skin. Words such as life-source and blue had a 2% frequency percentage, ranking them in the top 10-word frequencies used in Blue Buffalo’s product description.

Table 9. Blue Buffalo Customer Count Results

	Word	Attribute Category	ALL Count	ALL Count %	Satisfied Count	Satisfied Count %	Unsatisfied Count	Unsatisfied Count %
1	symptom	health/benefit	137	2.62%	114	2.50%	23	4.66%
2	weight	health/benefit	132	2.52%	107	2.34%	25	5.06%
3	cheap	price	132	2.52%	108	2.37%	24	4.86%
4	smart	other	131	2.50%	110	2.41%	21	4.25%
5	lab	breed	129	2.46%	110	2.41%	19	3.85%
6	nut	ingredient	126	2.41%	106	2.32%	20	4.05%
7	digest	health/benefit	124	2.37%	96	2.10%	28	5.67%
8	flavor	taste	124	2.37%	95	2.08%	29	5.87%
9	fir	health/benefit	122	2.33%	83	1.82%	39	7.89%
10	cheaper	price	122	2.33%	98	2.15%	24	4.86%
11	salmon	ingredient	121	2.31%	97	2.12%	24	4.86%
12	allerg	health/benefit	120	2.29%	96	2.10%	24	4.86%
13	back	health/benefit	120	2.29%	98	2.15%	22	4.45%
14	hip	health/benefit	118	2.25%	85	1.86%	33	6.68%
15	lamb	ingredient	118	2.25%	92	2.02%	26	5.26%
16	manufact	processing	117	2.23%	109	2.39%	8	1.62%
17	tast	taste	117	2.23%	101	2.21%	16	3.24%
18	formul	ingredient	116	2.22%	87	1.91%	29	5.87%
19	mix	processing	116	2.22%	99	2.17%	17	3.44%
20	rib	health/benefit	114	2.18%	86	1.88%	28	5.67%

The data shows the term “ear” was used by the highest amount of Nestle Purina’s customers. It can be inferred that this was the term which Purina’s customers value most. “Meal” ranked second amongst all customers combined and first amongst satisfied customers. Many customers referred to the ingredient aspect of the product when using the term “meal”. For

example, many customers mentioned. Although Purina had a lower word frequency for the term “healthi” than Blue Buffalo, the word frequency percentage was higher for Purina as they had a lower total amount of words used in the product description than Blue Buffalo. However, like Blue Buffalo, Purina customers were also health-conscious customers. They highlighted many words associated with the benefit of the product on the health and different body parts of the animals. These words included “lean”, “ill”, “skin”, “diet”, “lamb”, “skin”, and “liver”.

Amongst all unsatisfied Purina customers, the term “bag” had the highest customer count. Terms “chicken” “ear” “mix” “pea” and “rice” were also amongst the terms with the highest customer count. It is inferred that many unsatisfied customers may have ranked the product as unsatisfactory due to a problem with their product packaging. Although we cannot confirm, many of these types of problems could be one-time issues. If so, the company should not place focus and resources into the issue. However, the company places high priority on recurring issues causing customers to dislike the product. In the data, we can associate the level of recurrence of an issue with the frequency of the use of a word. For example, unsatisfied Purina customers used the term “bag” 25 times. In contrast, 16 unsatisfied customers mentioned the term “taste”. It can be inferred from this, the recurrence of customers experiencing problems with the bag or packaging of the product is higher than the recurrence of customers dogs disliked the taste of the product. In this case, the company places a higher priority on the physical changing packaging of the product resulting in a change in the form and perception of the quality of the product packaging.

Table 10. Nestle Purina Customer Count Results

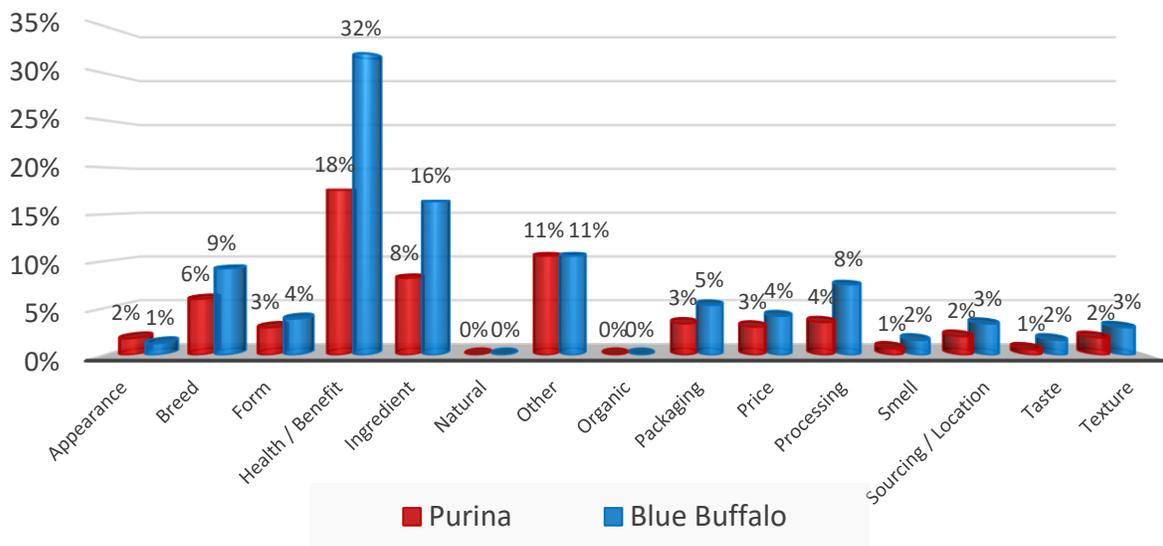
	Word	Attribute Category	ALL Count	ALL Count %	Satisfied Count	Satisfied Count %	Unsatisfied Count	Unsatisfied Count %
1	ear	health/benefit	117	2.23%	98	2.15%	19	3.85%
2	meal	health/benefit	112	2.14%	100	2.19%	12	2.43%
3	lean	health/benefit	107	2.04%	99	2.17%	8	1.62%
4	ill	health/benefit	106	2.02%	90	1.97%	16	3.24%
5	chick	ingredient	105	2.01%	83	1.82%	22	4.45%
6	chicken	ingredient	105	2.01%	83	1.82%	22	4.45%
7	clean	other	103	1.97%	95	2.08%	8	1.62%
8	bag	packaging	100	1.91%	75	1.64%	25	5.06%
9	afford	price	99	1.89%	91	1.99%	8	1.62%
10	price	price	99	1.89%	81	1.77%	18	3.64%
12	meat	ingredient	95	1.81%	87	1.91%	8	1.62%
11	eas	other	95	1.81%	78	1.71%	17	3.44%
13	size	packaging	95	1.81%	85	1.86%	10	2.02%
14	skin	health/benefit	92	1.76%	83	1.82%	9	1.82%
15	diet	health/benefit	91	1.74%	83	1.82%	8	1.62%
16	chunk	form	88	1.68%	78	1.71%	10	2.02%
17	hound	breed	87	1.66%	75	1.64%	12	2.43%
18	lamb	ingredient	87	1.66%	79	1.73%	8	1.62%
19	liver	health/benefit	86	1.64%	76	1.66%	10	2.02%
20	mix	processing	86	1.64%	67	1.47%	19	3.85%

7.2.3 Online Customer Review Attribute Category Results by Word Frequency

Data to address objective two was collected from Blue Buffalo and Nestle Purina online customer reviews. Customer word frequency results will be analyzed in this subsection. The results indicated that customers for both products perceive the same attributes of the products as value as they did in the customer count results. Of the sixteen attribute categories, both company customers place their primary value on health/benefit and ingredient attributes. Like in the customer count, these are two of the top characteristics highlighted in the product descriptions of both companies. It can be inferred that both companies were successfully marketing the value of their health/benefit and ingredient attributes, as customers successfully perceive these benefits as

value. In many of the attribute categories, Blue Buffalo’s customers has a higher frequency percentage than Nestle Purina’s customers. This can be attributed to the large discrepancy in the number of reviews analyzed for the study.

Figure 12. Online Customer Review Attribute Category Results (By Word Frequency)



7.2.4 Online Customer Review Keyword Frequency Results

The word frequency data provides a valuable insight into the most frequently used terms by customers. The word “weight” was the term used the most by Blue Buffalo online customers. The term had a customer count of 137, inferring that of all words mention by Blue Buffalo customers, they associate the term “symptom” with the Blue Buffalo Life Source product. It can be inferred that the customers are referring to the desired or amount of weight, which the owner would like for the pet to be. “Mix” and “lab” were second and third highest frequency mentioned amongst Blue Buffalo customers. Nestle Purina, on the other hand, top 3 terms were “bag”, “ill”, and “chicken”. Many of the top terms used by Purina customers are top terms mentioned by

satisfied and unsatisfied customers. However, the results closely resemble unsatisfied frequency results.

Table 11. Blue Buffalo Customer Word Frequency Results

	Word	Attribute Category	ALL Freq	ALL Freq %	Satisfied Freq	Satisfied Freq %	Unsatisfied Freq	Unsatisfied Freq %
1	weight	health/benefit	161	0.43%	136	0.47%	25	0.24%
2	mix	processing	153	0.41%	127	0.44%	26	0.25%
3	lab	breed	149	0.40%	127	0.44%	22	0.22%
4	back	health/benefit	146	0.39%	117	0.41%	29	0.28%
5	cheap	price	146	0.39%	121	0.42%	25	0.24%
6	digest	health/benefit	145	0.39%	115	0.40%	30	0.29%
7	hip	health/benefit	144	0.38%	106	0.37%	38	0.37%
8	blue	other	144	0.38%	121	0.42%	31	0.30%
9	symptom	health/benefit	137	0.20%	114	0.40%	23	0.23%
10	buffalo	other	135	0.36%	100	0.35%	35	0.34%
12	rib	health/benefit	134	0.36%	100	0.35%	34	0.33%
11	chick	ingredient	133	0.35%	118	0.41%	27	0.26%
13	chicken	ingredient	133	0.35%	118	0.41%	27	0.26%
14	brand	other	133	0.35%	101	0.35%	32	0.31%
15	smart	other	131	0.30%	110	0.38%	28	0.27%
16	cheaper	price	131	0.35%	106	0.37%	25	0.24%
17	size	packaging	130	0.35%	110	0.38%	20	0.20%
18	tast	taste	130	0.35%	113	0.39%	17	0.17%
19	chin	health/benefit	129	0.34%	104	0.36%	25	0.24%
20	salmon	ingredient	129	0.34%	104	0.36%	25	0.24%

Table 12. Nestle Purina Customer Word Frequency Results

	Word	Attribute Category	ALL Freq	ALL Freq %	Satisfied Freq	Satisfied Freq %	Unsatisfied Freq	Unsatisfied Freq %
1	bag	packaging	129	0.53%	100	0.62%	29	0.35%
2	ill	health/benefit	129	0.53%	103	0.64%	26	0.31%
3	chick	ingredient	124	0.51%	100	0.62%	24	0.29%
4	chicken	ingredient	124	0.51%	100	0.62%	24	0.29%
5	eas	other	112	0.46%	93	0.58%	19	0.23%
6	afford	price	106	0.43%	98	0.61%	8	0.10%
7	brand	other	101	0.41%	87	0.54%	14	0.17%
8	size	packaging	101	0.41%	89	0.55%	12	0.14%
9	box	breed	101	0.41%	91	0.57%	10	0.12%
10	mix	processing	100	0.41%	77	0.48%	23	0.27%
12	chunk	form	100	0.41%	90	0.56%	10	0.12%
11	lbs	packaging	99	0.41%	91	0.57%	8	0.10%
13	meat	ingredient	98	0.40%	90	0.56%	8	0.10%
14	cheaper	price	98	0.40%	90	0.56%	8	0.10%
15	liver	health/benefit	97	0.40%	87	0.54%	10	0.12%
16	fir	health/benefit	96	0.39%	78	0.49%	18	0.21%
17	ingredi	ingredient	96	0.39%	74	0.46%	22	0.26%
18	itch	health/benefit	94	0.38%	77	0.48%	17	0.20%
19	diet	health/benefit	94	0.38%	86	0.54%	8	0.10%
20	ear	health/benefit	93	0.38%	72	0.45%	21	0.25%

7.3 Objective 3 Results

Evaluate the extent to which the customer perception of the value derived from specific attributes aligns with the company's intended attribute-based differentiation.

7.3.1 Three-Circle Venn Diagram Analysis Results By Attribute Category

Figure 13. Three-Circle Venn diagram Sections

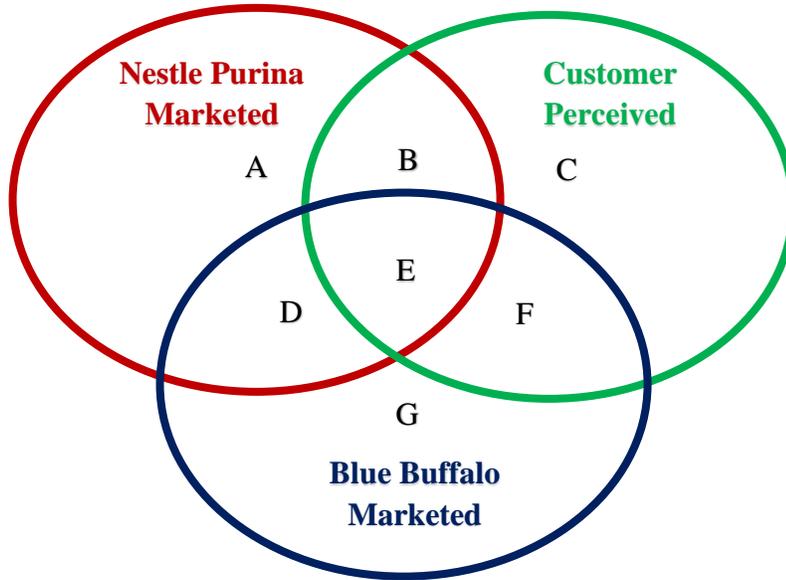


Table 13. Three-Circle Analysis Attribute Category Results

Section A	Section B	Section C	Section D	Section E	Section F	Section G
	Natural	Breed		Appearance		
	Sourcing / Location	Form		Health / Benefit		
		Organic		Ingredient		
		Packaging		Natural		
		Price		Processing		
		Smell		Other		
		Taste				
		Texture				

Table 14. Three-Circle Analysis Keyword Results

Section A	Section B	Section C	Section D	Section E	Section F	Section G
	digest	appear		blend	acid	
	heart	basi		coat	amount	
	nutrit	beagl		glucosamin	antioxid	
	realchicken	box		healthi	artifici	
	sourc	boxer		highqual	avail	
		breed		ingredi	bag	
		bulldog		joint	balanc	
		chihuahua		muscl	blue	
		coateven		natur	bone	
		coaty		omega	byproduct	
		cockapoo		protein	calcium	
		cocker		skin	carbohydr	
		corgi			chicken	
		dane			coldform	
		drydiscolor			energi	
		german			exclus	
		gloss			fatti	
		glossi			flavor	
		greyhound			formul	
		hound			formula	
		lab			fruit	
		labrador			function	
		mastiff			grain	
		mutt			health	
		pinscher			immun	
		pitbul			import	
		pooch			lifesourc	
		poodl			manufactur	
		pug			meal	
		schidigera			nocorn	
		schnauzer			nutrient	
		shepard			poultri	
		shephard			preserv	
		shepherd			recip	
		shine			rice	
		shiney			select	
		shiniest			shini	
		shinni			soy	
		shinnier			teeth	
		spaniel			veget	
		symptom			veggi	
		york			wheat	
		yorki			wholesom	

The three-circle analysis was used to visualize the linkage between the terms used by each of the two companies and the overall customer. The results show that each of the terms marketed by both companies do customers perceive all. This is shown by the fact that there are no words to fall in sections A, D, and G. These three sections are the sections, which does not overlap with the customer circle. Section B displays the current offerings of Nestle Purina perceived by customers and not offered and associated with Blue Buffalo's product. Key terms in this section includes: "source", "digest", "nutrit", and "realchicken". Section C represents the information perceived by customers, yet not marketed by either company. This section had the largest amount of words of each of the seven sections. Key terms in this section include "symptom", "shiney", "drydiscolor", "gloss". Most notably, this section contains many of the dog breeds mentioned by customers. As shown above, this is the primary attribute in this section.

Section E represents the information marketed by both companies and successfully perceived by customers. Many of the key attributes, which determines the type of product market a company's product is operating in can be found in this section. The notable terms in this section includes "blend", "coat", "highqual", "joint", and "muscl". Many of the words in this section falls under the health/benefit and ingredient-based attributes. Section F represents the information marketed by Blue Buffalo, not marketed by Purina, and successfully perceived by customers. This section highlights Blue Buffalo's current points of differentiation. Notable terms such as "lifesourc", "immune", "balance", "bone", "energi", etc. There are currently more words in this section than Section B which is Purina's point of differentiation. This is expected as Blue Buffalo markets a larger amount of terms/information about their product. Overall, the three-

circle results showed that customers successfully perceive the words marketed by the companies as value.

Chapter 8 - Conclusion

The primary objectives of this research were to identify the most prominent product attributes characteristics marketed by pet food companies and valued by pet food customers; and identify the extent of the alignment between the two. Successful achievement of the objectives provided valuable insights into how pet food companies can adjust their marketing strategies to mirror the characteristics customers associate with the product. This research also benefits pet food producers in the animal health corridor region and the state of Kansas to help them ensure they are producing and marketing product characteristics customers demand. In addition, the insight adds to the incredible pet food academic research being conducted in the state of Kansas and Kansas State University. With increased competition, customers demand has been divided amongst different players in the market. As a result, it is important for businesses to make their customers recognize and associate their product with the unique product characteristics they offer.

The ability of the companies to accurately analyze and interpret customer value perceptions and expectations is crucial for successfully capturing and maintaining market share in competitive markets (Ampuero & Vila, 2006; Rettie & Brewer, 2000; Silayoi & Speece, 2007). Use of online customer review analysis provides a new avenue to gather data to observe the characteristics customers value. The data provides insight into which issues may be recurring issues through the word frequency and customer count. Correlating this insight with product rankings provides more information on which terms or attributes are associated with positive and negative perceptions. However, the data does not confirm the context in which satisfied and unsatisfied customers are using the term, now. There is opportunity for future research to fill in the contextual gap blocking the insight behind. The three-circle and seven step analysis

approaches were instrumental in interpreting the valuable information that lie within the raw text data.

8.1 Key Findings

The primary results showed both companies are primarily marketing the health/benefit characteristics to customers. Purina markets a higher number of attribute categories mentioned in their product description. It can be inferred from the results; Purina's marketing efforts seem to be more balanced than Blue Buffalo who places their primary marketing efforts on the input ingredients instead of taking advantage of the other categorical opportunities to take advantage of customer preferences. However, Blue Buffalo currently has more keywords perceived by customers than Nestle Purina. This could be the result of the higher number of keywords marketed in the product description by Blue Buffalo than Purina. Although Blue Buffalo mentions more words related to the product attributes than Purina,

The results also revealed pet food customers tend to place the most value on health/benefit and ingredient characteristics. In fact, they place more value on input ingredient characteristics such as vitamins, meats used, and grains used than they do the ingredient processing characteristics such as natural, fresh, etc. This is suspected to be associated with the increase in demand for premium products such as natural, healthy, local. To prevent from violating FDA [AAFCO] packaging guidelines, pet food companies are strategically associating the ingredients used to produce their product with the health/benefits. For instance, Nestle Purina highlights in their product description that their product contains Omega 3's that are associated with joint health. Indirectly, the companies are stating their product aids in joint health. As a result, the frequency of words mentioned by both the companies and their customers were high as it relates to the ingredients in the product and the associated health/benefits.

The three-circle analysis results showed that each of the attributes and terms marketed by both companies are perceived by customers. This implies that both companies are successfully communicating the value of their products to customers. The model highlights Nestle Purina's current point of differentiation in terms of their use of words related to natural and sourcing/location product features, displayed in section B of the model. Blue Buffalo did not market neither of the two categories. The three-circle analysis also highlighted attribute categories which customers demand and/or perceive which neither companies' market. These attribute categories include breed, form, organic, packaging, price, smell, taste, and texture.

8.2 Limitations

The primary limitations of this research are the low number of unsatisfied reviews. Many of the results from the analysis suggested different characteristic values for unsatisfied customers compared to the overall customer results. This is primarily due to the large ration of satisfied reviews obtained to unsatisfied. Increasing the number of unsatisfied reviews will provide better validation of the results for the overall customers and the unsatisfied customers as well. The other limitation of this research is the assumption that the context in which the data was observed in raw text form is the context intended by the customers. To mitigate some of this limitation, the researcher had access to read many of the reviews to observe how the words were used.

8.3 Further Research

This research paper opened the door for many avenues for future research. As previously stated, there is a limited amount of economic research that has been conducted in the pet food industry. As the industry continues to grow, the demand for research in the industry will continue to increase as well. The limited knowledge of pet food research coupled with the limited knowledge of online customer review text mining research provides many opportunities, as we

are currently unaware of the powers of this type of research. In addition to the customer review analysis, this paper offers opportunity for improvement of ways to analyze the large data retrieved from online customer reviews. There is a plethora of information in the pet food industry and other agricultural avenues available, which has yet to be tapped into. Research will continue to develop ways to access, sort, and analyze the information to improve quality of life for pets.

Eye-tracking technology is a beneficial tool in customer marketing research, which is being utilized to gather pre-purchase data obtained from product packaging content. This will provide insight into the attribute characteristics customers spend the most time examining. For example, this could include certain attribute words like natural, grain free, gluten, etc. The eye-tracking technology will track and generate data of the content spend the largest amount of time examining, conduct a gaze frequency count, and observe the content which is first examined. This will allow researchers to compare the correlation and overlap of online customer review pre- and post-purchase data. Upon completion of this, we will possibly develop an econometric model to show the effect of marketed product attribute characteristics, packaging placement, and customer desired characteristics on the effectiveness of company marketing strategies.

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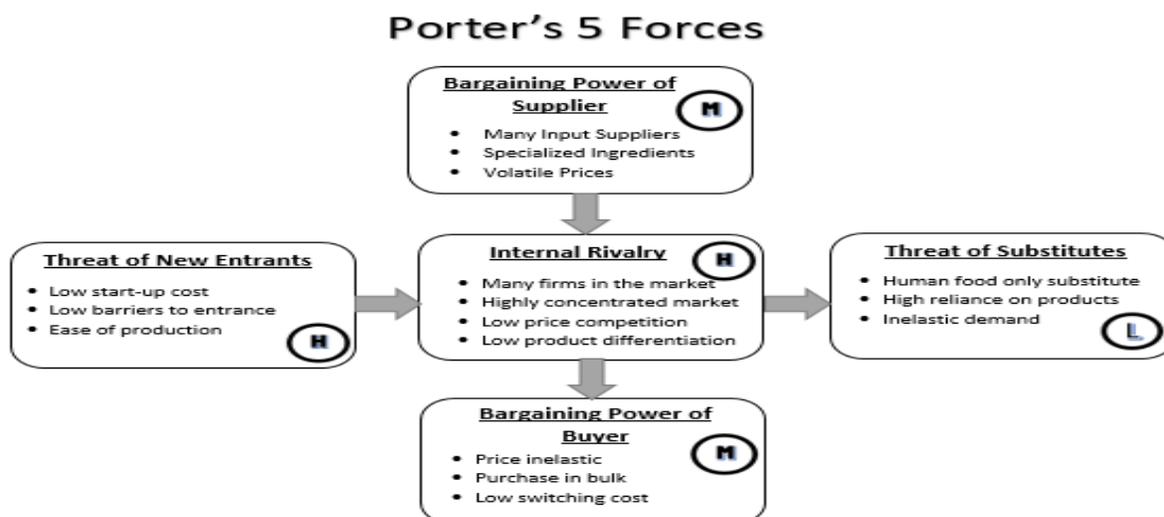
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Appendix A - External Pet Food Market Analysis

Figure A.1. Porter's Five Forces



A.1.1 Internal Rivalry

High internal rivalry in the market exist when many companies produce and market similar products aimed at the same target markets (Phillips et al., 2014). According to Pet Food Industry database, there are an estimated 133 companies operating in the pet food industry in 2016 (Pet Food Industry, 2017b). Although there is a large number of companies in the industry, the market is considered to be mildly concentrated as the top five companies control 47% of the market share, and the top ten control 52% (Pet Food Industry, 2017a). As many companies in the pet food industry operate under the horizontal integration strategy, low product differentiation and low-price competition exist in the market. Majority to all products attributes has a wide variety of substitutes within the same category. Due to the high competition, mild concentration of the market, and low product differentiation, the pet food industry's internal rivalry component is considered high.

A.1.2 Bargaining Power of Supplier

Bargaining power of suppliers is an important component of an industry external analysis used to examine the ability of an input supplier to demand higher prices which would extract industry profits (Porter, 2008). It is considered high when low input market competitiveness, high industry concentration, and supplier price discrimination exists. In the pet food industry, there are many grain and meat input suppliers in the market, as these are the primary ingredients used in pet food. However, customer's demand for premium products has caused many companies to switch to specialized input ingredients such as natural and organic inputs, resulting in increased demand for these specialized products (Passport, 2017b). Pet food companies are negatively impacted by this as it limits the number of suppliers they can purchase ingredients from, while increasing input cost (Phillips et al., 2014). Pet food companies are also susceptible to increased input prices reducing their profit margins as their demand for inputs are inelastic. This was exemplified by the increase in input prices during the recession in 2008 (Passport, 2017b; U.S. Bureau of Labor Statistics, 1985). Although pet food companies were able to pass a portion of the increased cost to customers, they still experienced a decrease in profit margins (Josephson, 2018). Overall, the bargaining power of suppliers is medium as of now due to the large numbers of suppliers in the market, and because pet food production does not rely solely on specialized ingredients. As the premiumization trend continues to expand, pet food companies are expected to increase their reliance on specialized ingredients, resulting in a shift in the bargaining power of suppliers from medium to high.

A.1.3 Bargaining Power of Buyer

Bargaining power of buyers refers to the ability of customers to force firms to offer better quality products at lower cost (Porter, 2008). It is considered high when customers are price

elastic, purchase in bulk, and have low switching cost. In the pet food industry, the bargaining power of the buyer can be split into two groups: retailers and end customers. In terms of the retailer, the bargaining power is considered medium to low primarily due to their high volume of purchases, and the low cost associated with switching to other pet food products. However, they are inferior to pet food companies in terms of price sensitivity as many companies offer a wide variety of products within each price category of pet foods. Bargaining power of the end customers are considered to be low as they too are considered to be price inelastic as shown through their consistent purchase of pet food during the 2008 recession when prices increased and real income decreased (Passport, 2017b; Phillips et al., 2014). Customers are also considered to have low bargaining power as they purchase in small quantities, as they tend to purchase products by 4, 15, and 24-pound bags versus retailers who purchase by the ton. Low product switching cost exist for customers as well as they can easily switch to human food to feed their pets at a low cost. Overall, the bargaining power of buyers for the entire pet food industry is considered medium due to inelastic demand for pet food products, low switching cost, and the high volume of products that are purchased.

A.1.4 Threat of New Entrants

Threat of new entrants is a force used by managers to assess the likelihood of new competitors joining the industry. This holds great value in growing markets as companies compete for market share. Threat of new entrants are considered to be high when there are low barriers to entry, existence of economies of scales, low capital requirements to enter the market, and little to no government policies in place to prevent easy entry (Porter, 2008). Barriers to entry in the pet food industry are considered to be low as there are no major investments and capital requirements needed to enter the market, given the new entrant isn't focused on

competing with the major companies in the market. Any entrant can simply create a specific blend of inputs to create and sell pet food products on a small scale platform. Attempting to compete with the major firms during the entry stage can be extremely difficult due to the high investment and capital cost required to compete at an efficient level. This is primarily due to brand loyalty and reputation, as well as the ability of the larger companies to take advantage of economies of scale. To compete with the large pet food market share occupants, an entrant must invest in industrial grade processing equipment, processing facilities, and workers with knowledge of pet nutrition to comply with federal laws and FDA regulations regarding pet health, nutrition, and labeling (Phillips et al., 2014). Other than the FDA regulations regarding pet health and nutrition, there isn't many policies preventing easy entrance into the market. Due to the low investment cost, barriers to entrance, and easy entrance policies, the threat of new entrants are considered high.

A.1.5 Threat of Substitute Products

The threat of substitute products in the pet food industry is considered low due to there being only one alternative to commercial pet food, high reliance on products, and elastic product demand. The only alternative to commercialized pet food is human food. Although home preparation of pet food is a viable alternative, many customers heavily rely on ready-made, store-bought pet food for convenience, easy storage, and nutritional value (Cellania, 2013; Elenbaas, 2015; Phillips et al., 2014). Due to their high reliance on commercialized pet food and home preparation being the only alternative, demand for pet food products are inelastic, as customers do not respond to price changes. This was exemplified through the increase in pet food demand during the recession in 2009 as prices increased, and over the past five years as prices has

increased due to the increase in the humanization trend (Passport, 2017b; Phillips-Donaldson, 2017c).