

**TRANSFORMING MATURE INDUSTRIES
INTO GROWTH INDUSTRIES: THE CASE
OF US PEANUTS**

by

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ABSTRACT

For more than a decade, the consumption of peanuts as food has been stagnant. This situation has been attributed to several factors. This study seeks to identify and understand some of the factors that have hindered growth in this industry and attempts to present recommendations that will be useful in transforming the peanut industry from stability to growth.

We determined that in addition to peanut prices, consumers' income and young children's share of the total population, substitute snack foods such as potatoes chips and popcorn influenced peanut consumption. We also discovered that consumer perception about peanut's fat content and the increasing concern about peanut allergies affected their consumption behavior. The research used data drawn from US Census Bureau, Department of Labor Statistics, National Agricultural Statistics Services, and various industry publications.

We suggest that changing the consumption trend lines in the peanut industry can be achieved through effective innovation and focused marketing of the product's health and convenience benefits.

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DEDICATION

This thesis is dedicated to my parents M. Fodouop Gabriel and Mrs. Ngamigne Rebecca.

Even though they never made it through primary school, they taught me basic life principles and showed me their love and support, which enabled me to earn a Master's degree.

CHAPTER 1: INTRODUCTION

1.1 Introduction

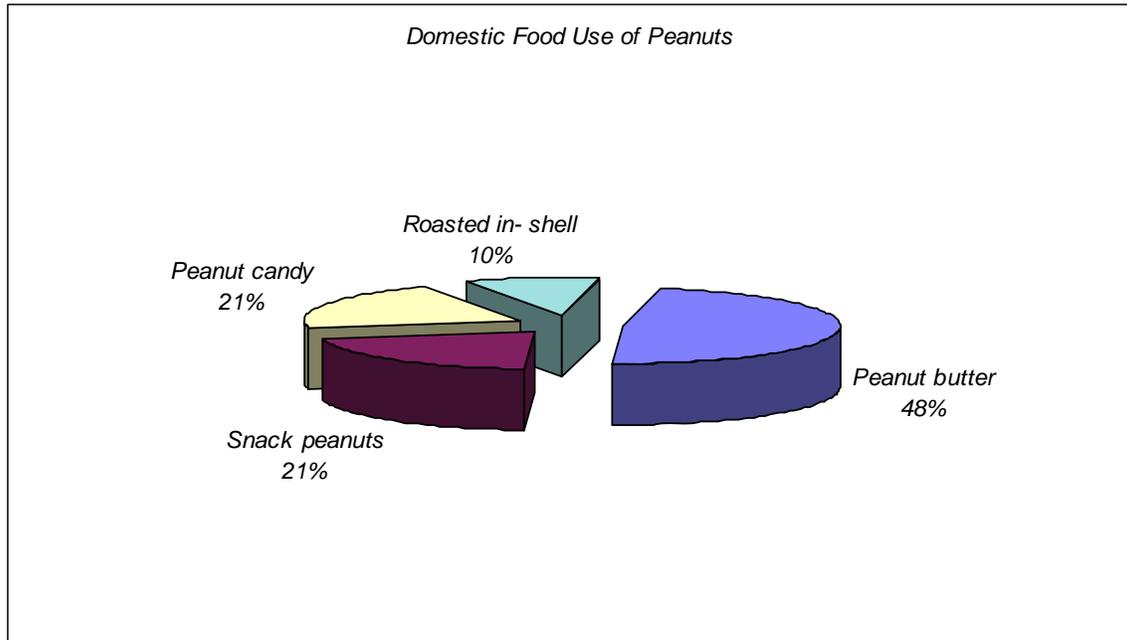
The estimated revenue of the US sweet and salty snack food industry in 2006 was approximately \$21.6 billion and most of this revenue was for domestic consumption (Snack Food Market Research, 2007). However, as consumers become increasingly concerned about the relationship between their health status and their snacking habits, a large majority of major industry players are taking advantage to bring innovative products in the natural and organic arena to market.

Nuts are an important part of the sweet and salty snack market. They have been a staple food of human being for thousands of years, providing vital nutrients such as protein and vitamin (Florkoski and Elnabheeb 1998). Among the many kinds of nuts consumed in the United States are peanuts, pecans, walnuts and cashews. Peanuts account for the lion's share of the U.S. nut market, accounting for about 80% of the nut market (Senhui et al, 2005).

The dominant use for peanuts in the United States is for food. Peanuts are also used in industry and processed into oil, which may also be used in food. Domestic food use of peanuts plays such an important role in U.S demand for peanuts that it is considered the primary factor determining U.S. peanut production (Rimal and Fletcher, 2002). Food use of peanuts comprises two main categories (shelled and in shell). Shelled Peanuts include those used for peanut butter (about 48 percent of peanut food use), snack peanuts (21

percent of peanuts food use), and peanut candy (21 percent). Roasted in shell account for about 10 percent of US food use of peanuts (Pooley, 2005) – (Figure 1)

Figure 1.1: Food Use of Peanuts



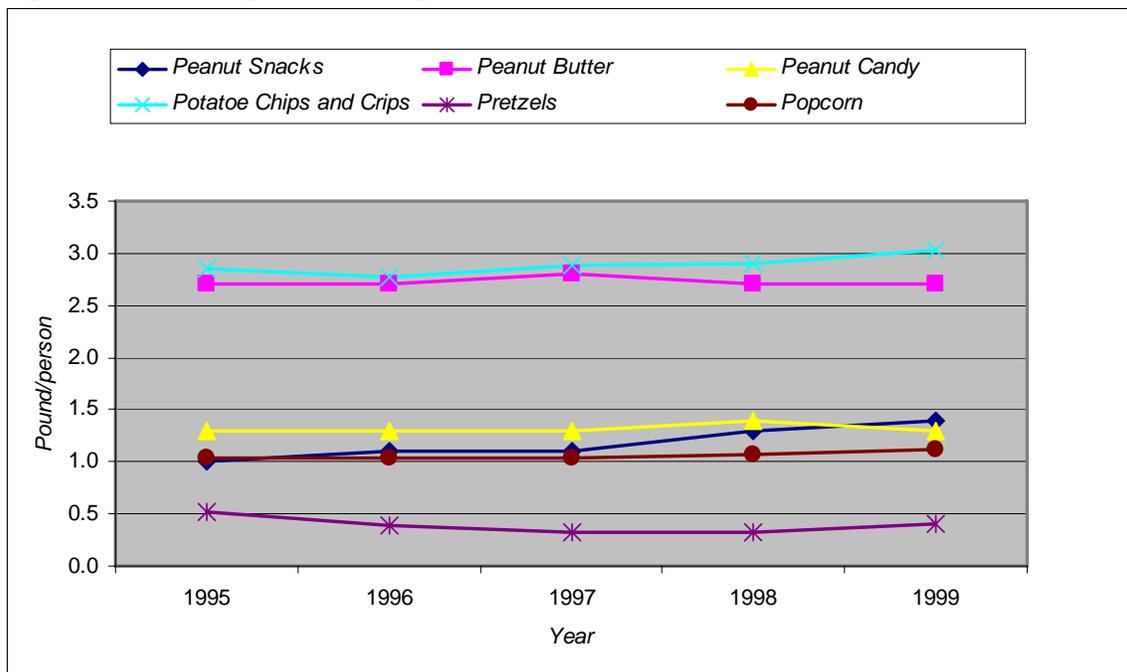
Source: Peanut Processing, 2006

Overall, national consumption of peanuts has declined 6.6 percent, from a high of 1.657 billion pounds in 1989 to 1.547 billion in 1993. In 1993 alone, the national market dropped 2 percent (The Virginian- Pilot, 1994). In 1995, when peanut sales were at their lowest, 275 million pounds of snack peanuts were consumed, a sharp drop from the 400 million pounds recorded only a decade earlier in 1985 (Senhui et al, 2005). U.S. peanut consumption has turned around since 1995; as food use rose almost without interruption to a projected record of 2.34 billion pounds in 2001/02 (Dohlman, 2002). The market share of snack nuts including snack peanuts in the U.S. domestic snack food industry has been declining over several years prior to 2000. For example, snack nuts had a 14.4 percent share of the snack food market in 1993, which declined to 12.4 percent in 1999

(Supermarket Business, 1993-99). The market share of snack peanuts in the U.S. domestic snack-food market has dwindled in the past two decades (Rimal and Fletcher, 2002).

This challenge to snack peanuts is coming from other snack foods such as popcorn, pretzels, and chips (Senhui et al., 2005). Figure 2 shows the trend in per capita consumption of some snacks consumed in the US from 1995 to 1999

Figure 1.2: Per Capita Consumption of Some US Snacks



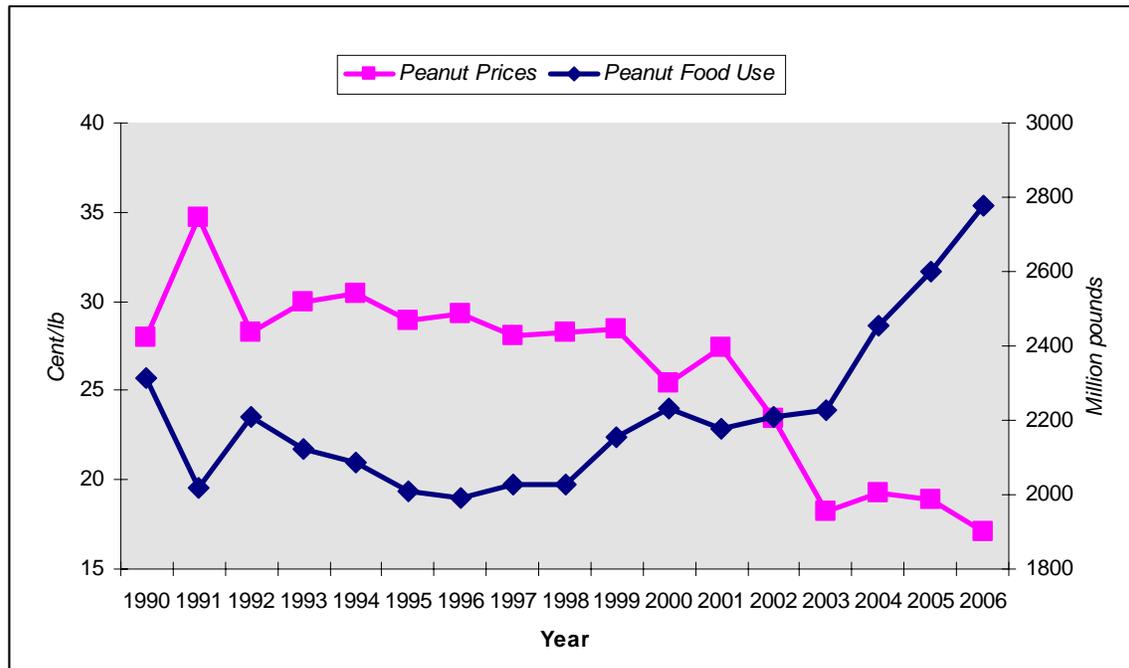
Source: USDA's Economic Research Service, using Infoscan retail scanner data

Other than the potential impact of fierce competition from other kinds of snack foods, a main driving force behind the dramatic decrease in snack peanut consumption is consumer concern about health risks associated with a high intake of fat (Senhui et al.,

2005). The same authors also reported that the slight rise in peanut consumption after 2000 was due to consumers' perceptions about the "good fat" in peanuts.

Recently, there has been a slight upward trend in the consumption of peanuts, which has been largely attributed to the lower prices stemming from the 2002 policy change, which eliminated the long-standing peanut marketing quota system. (Dohlman and Livezey, 2005). Figure 2 below indicates the trend.

Figure 1.3: Domestic Food Use of Peanuts vs. Prices



Source: National Agricultural Statistics Service, USDA

It is important for policy makers and peanut industry leaders to understand the factors affecting domestic consumption of snack peanuts in order to build on the momentum resulting from the 2002 upward trend in peanut consumption.

1.2 Research Problem

It is apparent that consumption of peanuts was stagnant for decades prior to the growth observed from 2002. The research problem is to understand variables determining domestic peanut consumption and propose solutions that would help boost peanut consumption in the US.

1.3 Objectives

Based on the nature of the peanut industry, the objectives of this study are to:

1. Evaluate consumer characteristics and other factors affecting growth in peanut consumption
2. Evaluate the innovation trends that have occurred in the peanut industry over the last decade
3. Develop recommendations to help the industry boost peanut consumption based on the results of Objective 1 and 2.

1.4 Methods

The methods that will be applied in meeting the above objectives are literature review, statistical analysis, and econometric analysis. We review the literature from industry and government to track scientific and business factors influencing the growth of domestic peanut consumption. We also use the literature and statistical analysis to determine the current competitiveness of the peanut industry against factors affecting its growth.

Innovation and entrepreneurship literature are to be exploited to provide case examples of changes brought into mature markets. We use data from the United States Department of

Agriculture and industry reports to provide the base for the statistical and econometric analyses in order to address some objectives of this study.

Finally, we provide recommendations using the data from the literature review and the statistical and econometric analyses to provide potential solutions to successfully transform the mature peanuts industry into a growth industry.

1.5 Outline

The remainder of this thesis is presented as follows: The literature review in chapter 2. Chapter 3 presents the theoretical path and discusses the models used in the statistical and econometric analyses. In Chapter 4, we present the results of the analyses. The summary, conclusion and recommendation are presented in chapter 5.

CHAPTER 2: LITERATURE REVIEW

Rimal et Fletcher (2002) reported that the sluggish demand for domestic peanut snacks was concerning because a continuous decline in consumption will imply a shrinking peanut industry. It is therefore important for policy makers and peanut industry leaders to understand the factors affecting domestic consumption of snack peanuts and to develop ways to boost the recent upward trend in peanut consumption. Consumption for domestic food use of peanuts had followed a downward trend from marketing year 1989 to marketing year 1996. The decline has been attributed to several factors among which changing demographics, (primarily fewer numbers of children among the baby-boomer generation), health and dietary concerns about the fat content in peanuts, and competition from other snack foods that had prompted consumers to shift away from higher-priced peanut products toward others lower-priced snack products. In a reversal of this trend, starting in marketing year 1997, U.S. peanut consumption for food has increased at an average of 1.8% each year (Jurenas, 2002). Observers speculate that this recent trend might reflect a decline in concern over fat in foods, a growing awareness by consumers of studies that show, eating peanuts may be beneficial to health, and increased retail promotion by peanut product manufacturers.

2.1 Characteristics of Mature Industries

Mature industries are for the most part characterized by the following:

- Slow overall market growth
- Increased competition for market share with increased emphasis on price

- Experienced buyers have leverage over producers
- Product research becomes largely incremental – few revolutionary inventions
- Falling industry profitability

A growth strategy to overcome market maturation can be market segmentation by looking for products, customers and or regions that are growing faster than the industry average, and positioning mature industries to capitalize on the growth (Brown, 2002).

Another growth strategy is to extract value (or even create new value) by improving the flow of goods and service in the value chain. It is also possible to unleash growth by reconfiguring the business and its products through integration, alliances and innovation (Brown, 2002).

2.2 Entrepreneurship in Agriculture

Entrepreneurship in food and agriculture involves the discovery of opportunities with uncertain outcomes through alertness to the environment and the effective translation of such discoveries into desired ends (Amanor-Boadu, 2006). However, entrepreneurship has almost as many meanings as the number of people studying it. For example, some people take entrepreneurship to mean primarily innovation while others define it principally in terms of risk-taking. Others view it as a market stabilizing force while some see it as disruptive, owning and managing a small business. Accordingly, the entrepreneur is often viewed as a person who either creates new combinations of production factors such as new methods of production, new products, new markets, finds new sources of supply and new organizational forms; or as a person who is willing to

take risks; or a person who, by exploiting market opportunities, eliminates disequilibrium between aggregate supply and aggregate demand, or as one who owns and operates a business (Tyson, et al., 1994). Entrepreneurs must incessantly recombine resources to create new products, processes markets and/or new structures.

In a statement addressing the downward trend of the peanut market, Bob Fortmeier, manager of commodities and ingredients for Con-Agra Grocery Products, said, “We are optimistic that consumption will increase, and we will need to buy more peanuts. We can then invest more money in our plants and in new products, and hopefully that means the farmer will grow more peanuts to meet the new demand” (The Peanut Grower, 2003). Joseph Schumpeter (1934) linked the entrepreneur not only to uncertainty but also to innovation. Based on this approach, entrepreneurs bring a revolution to the traditional ways of production by exploiting inventions or untried technological possibilities for producing new products or producing old ones in new ways.

2.3 Food and Agricultural Innovations

Ted Higginbotton, Texas peanut grower and current chairman of the National Peanut Board said “peanut consumption can be increased if the industry pulls together to promote peanuts through a unified and targeted effort (The Peanut Grower, 2003). He further said, “I would like to see this working relationship develop through joint peanut promotion and advertising of existing products and new product development,” (The Peanut Grower, 2003).

New product developments result from innovations, but those innovations must be put into practice for a new product come to life. Christensen (1997) and Christensen and

Raynor (2003) presented a classification of innovations according to their impact on the market:

- Sustaining innovations
- Disruptive innovation.

Sustaining innovations are incremental improvements in an existing value proposition that sustain the competitive advantage of the firms undertaking them without any radical change in the nature and performance of the industries in which they operate. Disruptive innovations, on the other hand, alter the nature of the market and industries and create new sources of competitive advantage for the firms implementing them.

Another approach to grow mature markets can be to the adoption of blue ocean strategies (Kim and Mauborgne, 2005). They argue that tomorrow's leading companies will succeed not by battling competitors, but by creating "blue oceans" of uncontested market space ripe for growth. Such strategies they called "value innovation" because they create powerful leaps in value for the firm and its buyers, rendering rivals obsolete and unleashing new demand.

Some recent innovations that have occurred in the US peanut industry include the following:

2.3.1 Peanut Protein Concentrate (PPC)

The USAID (US Agency for International Development) and Peanut Collaborative Research Support Program (CRSP) funded a study, in an effort to design tasty foodstuffs that cut back on the fat. Peanut Protein Concentrate (PPC) was prepared from defatted

peanut flour a protein-rich and underused by-product of the peanut industry. Results obtained from this study suggest that the PPC could be used in food formulations requiring high emulsifying capacity, but would not be suitable for applications requiring high water retention and foaming capacity (Yu, 2006). The researchers said that the low viscosity of PPC suspension at room temperature and higher viscosity upon heating make PPC a desirable thickener for high protein soups and concluded that peanut protein isolates and concentrates have the potential to add value to the peanut industry and provide food processors with an affordable source of plant proteins with unique flavor and functional characteristics.

The US market for food emulsifiers currently stands at around \$505million, and is estimated to reach \$668million by 2012 (Frost and Sullivan, 2006). European Emulsifiers market, finds that the market earned revenues of \$574.0 million in 2006 and estimates this will reach \$911.3 million in 2013 (Frost and Sullivan, 2007).

2.3.2 Trans Fat Free Peanut Oil

Golden Peanut Company, a leading US peanut supplier has expanded into the peanut oil market, with the start up of a new multi million-dollar oil refinery (Food USA Navigator.com, 2007). The trans fat free issue is energizing the US market and driving the demand for peanut oil whose health benefits is one of the main selling points. Other advantages of the oil include its unique nutty flavor, low level of saturated fat, high smoke point and good stability.

2.3.3 Improved Peanut Varieties

ABC Radio Australia reported in one of its programs on innovations reported that researchers have developed a peanut variety that is crunchier even when raw by increasing the percentage of monounsaturated fats (good fats) while decreasing the more harmful saturated fats. Plant breeders did this by doubling the concentration of oleic acid and reducing the saturated component by 30 per cent, virtually eliminating linoleic acid.¹

The research indicated that the breakthrough was important for two reasons. Not only was the new peanut healthier, but the improved oil profile meant the nuts would have a longer shelf life. That is a big advantage for end-users of peanuts like confectionery, cereal, bakery and snack-food manufacturers. Chocolate and snack foods manufacturers using peanuts in their products want peanuts with this trait because it improves the stability of their product. In high oleic peanuts, flavor is maintained for a much longer period. This results of the discovery is very promising and the report indicated that Kraft now uses 6,000 tons of Australian peanuts every year to produce its peanuts butter.

2.3.4 Allergen-Free Peanuts

Exec Digital News (2007) reported that a North Carolina Agricultural and Technical State University agricultural researcher has developed a simple process to make allergen-free peanuts. The new process could provide relief to millions of peanut allergy sufferers, and be an enormous boon to the entire peanut industry. Doug Speight of the North Carolina Agricultural and Technical Office of Outreach and Technology Transfer says

¹ Origin comparison studies have shown US peanuts have the highest oleic/linoleic ratio, Argentine peanuts less, and Chinese peanuts the lowest oleic/linoleic ratio.

food companies are showing a strong interest in licensing the process, which does not degrade the taste or quality of treated peanuts, and might even render them easier to process for use as a food ingredient.

2.3.5 Marketing Innovations

In addition to new product innovations, variety development and food safety innovations, peanut promotion efforts on the basis of health and nutritional benefits have contributed to the slight upward trend in peanut consumption. Fletcher (2004) has reported that from 1997 through 2000 peanut consumption in the United States declined 3 percent and from 2001 through 2003, consumption increased by 9.7 percent. The change in consumption has been attributed to marketing efforts of peanuts as high in unsaturated fats known as good fats that are beneficial to health and have been shown to lower one's LDL-cholesterol levels

2.4 Other Innovations in the Food Industry

2.4.1 Danone's Activia

In the yogurt market, where competition is determined by price, vast choices of flavors and attractive packaging, the French based yogurt maker Danone turned things around by investing in R&D to create new products. Through its R&D effort Danone found a new starter culture for its yogurt; *Bifidus Animalis* and sold the product on its health benefits to consumers. When Activia is consumed and this bacteria get into the digestive track, it survives the gastric acid bath as it passes through the stomach and into the intestine, teaming up with other microorganisms to push fecal matter through the colon. *Bifidus*

Animalis is the key ingredient in Activia yogurt and has been very successful for Groupe Danone.

Activia posted nearly \$2 billion in worldwide sales in year 2006, up 30 percent and analysts say its introduction in the U.S. in 2006 was one of the most successful product launches in recent food-industry history, with sales expected to reach \$300 million in 2007 (Business Week Marketing, 2007).

Dannon had about 23 percent share of the U.S. market as of 2005, trailing behind General Mills' Yoplait, which had 28 percent. Yoplait had maintained its market share lead by adding flavors such as chocolate mousse to its Yoplait Whips line. It has also attracted a loyal female consumers base following through its visible sponsorship of breast cancer research through the "Save Lids to Save Lives" (Business Week Marketing, 2007). A longtime runner-up to General Mills Yoplait in the U.S, Dannon appears to be benefiting from its focus on healthier yogurt. Activia has grown 48% to \$181.3 million in sales in 2007 (Facenda, 2008). Dan Active experienced 185% growth, recording sales of \$60 million during that same period and Dannon Activia Light (2007) had 197.5% growth with sales of \$57 million (Facenda, 2008)

2.4.2 Casella Wine's Introduction of Yellow Tail

The US has the third largest consumption of wine worldwide. The U.S. market is \$20 billion per year and is intensely competitive. The wines produced in the US compete fiercely domestically and with imported wines. Casella wines, an Australian winery, redefined wine and demystified the ritual of buying wine by making a nontraditional

wine that is easy to buy and drink for everyone. Casella Wines created Yellow Tail, a wine whose strategic profile broke from the competition and was accessible to everyone: beer drinkers, cocktail drinkers and other drinkers of nonwine beverages. In the space of two years, Yellow Tail emerged as the fastest growing brand in the histories of both the Australian and the US wine industries and the number of imported wine into the US, surpassing the wines of France and Italy (Kim and Mauborgne, 2005)

2.5 Snack Food Industry Economics

The snack industry comprises establishments primarily engaged in one or more of the following: salting, roasting, drying, cooking, or canning nuts; processing grains or seeds into snacks; manufacturing peanut butter; and manufacturing potato chips, corn chips, popped popcorn, pretzels (except soft), pork rinds, and similar snacks (IBIS World, 2008).

The snack food industry is an important component of the US economy. The industry purchases raw agricultural goods from the nation's farms and converts these crops into packaged food in factories across the country. These products are then shipped to local grocery stores, convenience stores, and other retailers for sale to consumers. Virtually all major sectors of the U.S. economy contribute to the production of the final product.

The snack food manufacturing industry in the US generated about \$26 billion in annual sales (Snack Food Association, 2007). Approximately 394,000 employees work for over 13,500 companies in the snack food manufacturing and distribution industries. Payroll in these industries is over \$12 billion. Although large firms are involved in the snack food industry, these employees generally work in smaller businesses that are spread across the

country; the average place of business has 26 employees (National Economic consulting, 2006). Total output in the snack food industry amounted to over \$83 billion in 2000. For each \$100 of output (measured at manufacturers' sales prices), the snack food industry used \$66 from other sectors of the economy, including \$6.50 from the agricultural and milling sectors, \$9.60 from the business and professional services sector, \$6.70 from the paper sector, and \$33.80 of labor compensation and other value added (National Economic Consulting, 2006).

Relative to the total production of certain agricultural products, the snack food industry is a significant buyer. Each \$100 worth of potato chip output includes approximately \$11 of agricultural inputs, but also \$11 of packaging materials, \$8 of distribution costs, \$7 of plastics, \$6 of transportation costs, and over \$40 of labor compensation and other value added. (National Economic Consulting, 2006).

The roasted nuts and peanut butter manufacturing sector's revenue for the year 2006 was approximately \$6,340 million. The gross profit was 53.88 percent; there were 153 establishments in the industry that year (Supplier Relations US, LLC 2007).

The industry's revenue for the year 2007 was approximately \$6.6 billion USD, with an estimated gross profit of 33.82%. Import was valued at \$169.4 million USD from 60 countries. The industry also exported \$366.7 million USD worth of merchandise to 121 countries. Adding import value to and subtracting export value from the industry's

shipment value, the total domestic demand for the industry in 2007 was \$6.4 billion USD (Supplier Relations US, LLC 2008)

2.6 The Peanuts Market Situation

The issues that have hindered peanuts consumption are complex. Consumption for domestic food use fell an average 2.3 percent each year from marketing year 1989/90 to marketing year 1995/96, largely due to changing demographics, health and dietary concerns about the fat content in peanuts, and competition from other snack foods that had prompted consumers to shift away from higher-priced peanut products toward lower-priced snack products (Jurenas, 2002). The negative effect of the perceived health risk concerns on consumption of snack peanuts was mitigated by the release in 2000 of the results of the studies of Mediterranean diets and the “peanut butter” diets, which touted the health benefits of a diet of high-unsaturated fats, known as “good fats.” Snack peanut consumption has been on the rise since then (Senhui et al, 2005). With Consumer interest in a diet of “good fats,” together with the improvement of consumer knowledge about the nutritional attributes of peanuts and peanut products, demand for snack peanuts may increase.

2.6.1 Demographics effect on peanut consumption

Dr Helena Laroche, a University of Iowa physician, found in a study that adults living with children ate more fats than adults living without children. The subjects were asked how often they eat foods such as salty snacks, beef and pizza. Often, the research found. The study did not tell why those adults were consuming more of the above-mentioned

products; but the assumption is that those parents end up eating a share or even leftover from foods bought for children. Rimal and Fletcher (2002) reported that households with children were likely to participate in the snack peanut market, but children had a negative impact on the decision of how many times to purchase snack peanuts. One possible explanation for such conflicting behavior may be that young children are likely to be provided with snack peanuts by their parents as a snack food item; but are discouraged to eat in excessive quantity. Such ambivalence may have been caused by confusing nutritional information about peanut products. In addition to that, these households must spread their food expenditures over a broader set of food and other goods, resulting in a decline in peanut consumption.

However, there are concerns about whether over time, children will still constitute a solid consumers base for peanuts, considering the growing allergy trend. A study published in the *Journal of Allergy and Clinical Immunology* in late 2003 reported that the prevalence of peanut allergies in children doubled between 1997 and 2002, doubling from 0.4 percent to 0.8 percent of children. That means an estimated one in 125 children suffers from a peanut allergy.

2.6.2 Income effect on peanut consumption

Rimal and Fletcher (2002) also reported in a study that income was significant in the decision of whether to consume peanuts products and how many times to purchase. Household with higher income have a higher probability of participating in the snack

peanut market. In addition, those who are already in the market are likely to buy more snack peanuts as their income grew.

2.6.3 Health and dietary concerns effect on peanut consumption

Decline in peanuts consumption has been attributed to consumers concerns about its fat content. A steady decline in peanuts consumption reflected health and dietary concerns about fat content in peanuts (Dolhman, 2002). Peanut consumption suffered double-digit decline in the late 1980s and early 1990s due to the perception that peanuts were not healthy on account of their high content of oil (Peanut Collaborative Research Support Program, 2005). The household meal planners who are overly concerned about undesirable nutritional factors tend to decrease their purchase of snack peanuts, and those who are more concerned about desirable nutritional factors tend to increase their purchase frequency (Arbindra et al., 2002). The Peanut Collaborative Research Support Program study also reported that early studies developed new information on the vitamin, mineral, and trace element content of peanuts. Much of the existing information was over 40 years old and outdated. This new data coupled with studies that showed that peanuts consumption did not contribute to people getting fatter when peanut was added to the diet has stimulated the consumption of peanuts in the last 8 years.

2.6.4 Effect of competition From Others Snacks

The US Snack Food Manufacturing industry purchases ingredients such as milled corn and wheat, potatoes, sugar, flavorings and preservatives for making into consumer

snack foods such as potato chips, corn chips, popped corn, pretzels, pork rinds, peanut butter and other similar snacks. The market for processed snack foods is enormous, and a number of large corporations compete rigorously to capture larger shares of the snack food market. Consequently, heavy promotions are used to convince consumers to buy snack foods. The industry packages and sells such snacks to grocery product wholesalers and sometimes directly to retailers and export markets in return for payment. Therefore, peanuts products are facing fierce competition within the industry

2.6.5 Effect of Flavor on Peanut Snack Consumption

Wanki, (1999) reported that perceived attributes towards taste consistently influenced consumers' overall attitude toward peanuts and consumption behavior. James et al. (1984) Department of Food Science in North Carolina State University (1984) reported in a sensory evaluation study carried out with 320 subjects that 59% of the subjects preferred peanut butter based on taste, flavor and aroma. Sanders et al, (2003) concluded after a descriptive analysis and consumer acceptability study on peanut from different origins that US peanuts had a better roasted flavor and no off flavor as compared to peanuts from China and Argentina. The authors further indicated that consumer preference for specific US peanut flavor characteristics could result in significant marketing advantage.

Having evaluated some factors, that could potentially be hindering peanut consumption, and having discussed some innovative trends that have occurred in the peanut sector, it is quite clear that even though there are several opportunities applicable to the industry, peanut products like others snacks foods, have not had a life cycle that is consistent with

a significant growth. It is therefore of crucial importance that peanut industry leaders further understand factors affecting a turn around in peanut consumption and look to make proactive changes in the industry and market fundamentals. This can be done by applying blue oceans tools to create new markets and a new demand, which will result in a win situation for both the industry and its customers. This study is crafted to move in that direction.

CHAPTER 3: METHODS, MODEL AND THEORITICAL FRAMEWORK

This section discusses the data analysis approach and presents the model that will be used in evaluating the factors that are believed to affect the consumption of peanuts as food.

The goal is to discuss the perceived and real factors affecting the consumption of peanuts.

The principles that drive the model used will be discussed.

USDA/ERS data ranging from 1975 to 2005 is used. Data is also drawn from the U.S. Bureau of Census data on population and other demographic characteristics. Based on business literature, the stability in peanut consumption has been attributed to perception as a high fat commodity, competition from snacks such as popcorn, chips, and pretzels and to some extent, demographic factors. It is important to mention that peanut allergies are reported to be on the rise could potentially influence peanut consumption as well.

3.1 Methods of Analysis

We use an econometric technique that attempts to explain changes in total peanut consumption (dependent variable) as a function of changes in peanut prices (X_1), consumption of popcorn (X_2), potato chips (X_3), income (X_4), percentage of children in the population (X_5) and population (X_6), all independent variables. The model is estimated using a single equation as follows:

$$Y_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \epsilon_i \quad (1)$$

The meaning of the regression coefficient β in this equation is the impact of a unit change in X on the dependent variable. The dependent and independent variables were all obtained from the following sources: National Agricultural Statistics Services, US

Census Bureau, and Popcorn Industry Facts. Prior to estimating the model, economic theory, business literature and common sense were used to hypothesize the expected sign of each variable. The results of the model were also evaluated using the following:

- Coefficient of Determination (R Square): This measure how well the model explain the variation in the value of dependent variables
- T – Test : Statistical test measures the likelihood that our independent variable effects the dependent variable
- F- Test: A test of the significance of the coefficient of determination

The use of ordinary least square regression is an efficient tool in understanding the causal relationship among variables. For example, it allows us to explain how peanut prices and income cause consumption of peanuts to change. However, the OLS method has some inherent challenges that have to be addressed if the results are expected to make sense. For example, multicollinearity is the violation of the classical assumption when one independent variable is a perfect or near perfect linear function of one or more other independent variable (Studenmund, 2006). Heteroskedasticity is the violation of the classical assumption, which states that the observations of the error term are drawn from a distribution that has a constant variance (Studenmund, 2006).

Another crucial step is to choose the correct form of the equation for the model. This is done by running linear, quadratic and double log equations and selecting the best equation based on the relevant results (R square, F- Value, T – test).

Business literature has associated the lack of significant growth in peanut consumption to number of factors but there is no clear literature on how innovation and entrepreneurship have attempted to resolve maturity in the industry.

3.2 Nutritional Variables

Fat content has been a scapegoat when it comes to explaining the reason why the peanut industry has not grown significantly. We will attempt to use some statistical data for low fat and regular snacks to explain the effect of fat perception on snacks consumption.

Peanut allergies have been reported to be on rise. In fact, this issue is a long time problem that has been on the rise and is reported to have doubled in the past five years Choi et al, 2007. Some statistical data can explain what opportunities are there for peanut demand and consumption if allergic components are eliminated from peanuts.

3.3 Industry Variables

Others measurable factors that have been reported to affect peanut consumption can be modeled using the following demand equation:

$$DPC = f(PP, PC, PC, POP, PCI, AG, PO) \quad (1)$$

Where DPC is the consumption of peanuts as food, PP is the price of peanut, PC is the consumption of chips (potatoes only), POP is the consumption of popcorn, PCI is the per capita disposable income in the US, AG is the percentage of children aged 0 to 14 in the US population for the corresponding year and PO is the US population.

The signs hypothesis based on expectations arising from theory are as follows:

- $f^{PP} < 0$

- $f^{PC} < 0$
- $f^{POP} < 0$
- $f^{PCI} > 0$
- $f^{AG} > 0$
- $f^{PO} < 0$

Based on business and economic literature, we expect the per capita consumption of peanut products to decline as peanut prices go up. This assumes that peanut is a normal economic good. We expect the consumption of peanuts to drop as both the consumption of potatoes chips and popcorn increase because we assume they are both substitutes for peanuts. Rimal and Fletcher (2002) reported that households with higher income had a tendency to participate in the peanut snack market; so we will expect peanut consumption to increase as disposable income increases. Based on their study, households with children are likely to participate in the peanut market. Thus as the population of children (0-14) increases we will expect peanut consumption to increase. In addition, Jurenas (2002) attributed the decline in peanut consumption to a smaller number of children among the baby boomer generation. From 1975 to 2005, the percentage of children in the US population declined from 25 to 20%. Finally, with stagnation in peanut consumption, it is expected that the US population will be negatively correlated with peanut consumption.

The econometric model that will be used in conducting the analysis has been discussed. Some parameters that govern the model have been mentioned as well. Statistical data will

be used to analyze nutritional factors that affect snack food consumption then industry variable data will be used to run the model.

CHAPTER 4: DATA AND RESULTS

In this chapter, a description of the data used in this research is presented. The results from analyses are also presented as well as a discussion of the implication of those results on US peanut consumption.

4.1 Analysis of peanuts industry effects

Some industry variables that are believed to affect peanut consumption are peanut prices, income, age, population, the consumption of popcorn and potato chips.

The total consumption of peanuts (DCP) is the dependent variable used to represent the performance of the peanut industry. To achieve an accurate estimation of per capita consumption of peanuts for each year in the data set, peanuts consumption was divided by the entire US population in that year. Data used in the creation of this data set was acquired from the National Agricultural Statistics Services and from the US Census Bureau. This data is represented graphically in Figure 4.1.

Peanuts (PP) prices used are expressed in US dollars per pound and were obtained from the National Agricultural Statistics Services. This data is represented graphically in Figure 4.2. The drop in prices from 2001 to 2005 is the result of the 2002 Farm Act's elimination of the marketing quota system.

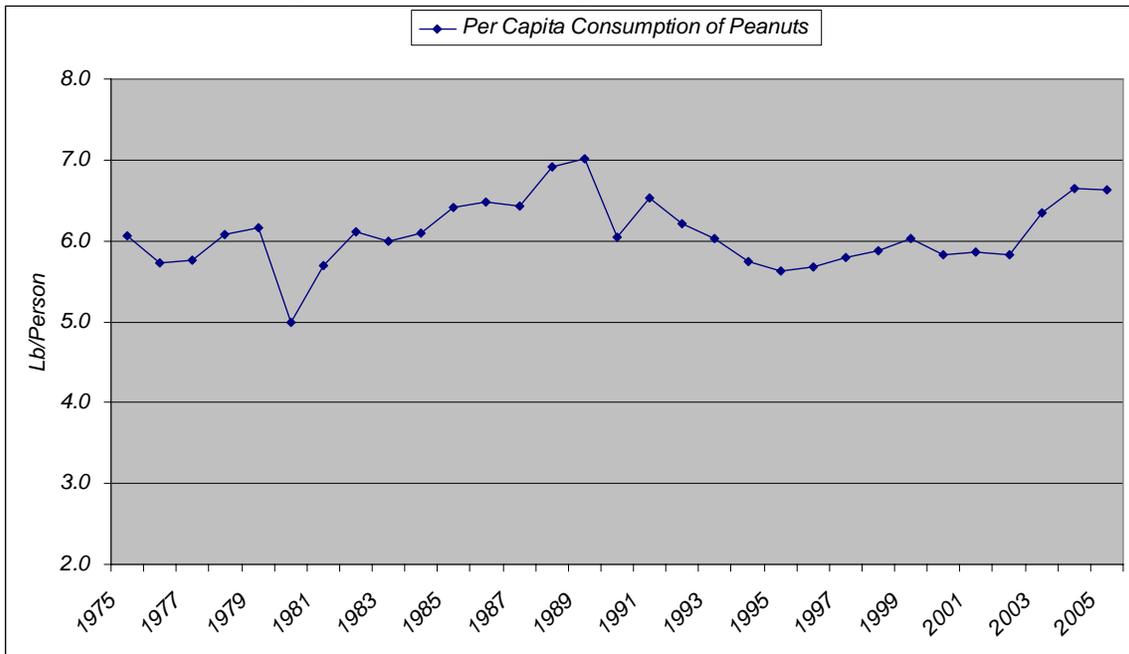
The data set representing Per Capita Income (PCI) is reported in US dollars and was obtained from the Bureau of Economic Analysis (BEA). This data set is represented graphically in figure 4.3.

Popcorn consumption is reported in pounds and was obtained from the popcorn industry facts reports (2005). Potatoes chips consumption is also reported in pounds and was obtained from the National Agricultural Statistics Services. Both popcorn consumption and potato chips consumption are represented graphically in figure 4.4. Per Capita Consumption of Popcorn and Potatoes Chips were obtained by dividing the annual consumption of each commodity by the corresponding US annual population. The Per Capita Consumption of each Commodity is graphically represented in figure 4.5

The data set representing children in the US population (AG) is the percentage of people aged 0-14 each year from 1975 to 2005. The source of this data is US Census Bureau using their international database. To get the percentage, the number of people aged 0-14 was divided by the entire population in each year. The data set is represented graphically in figure 4.6.

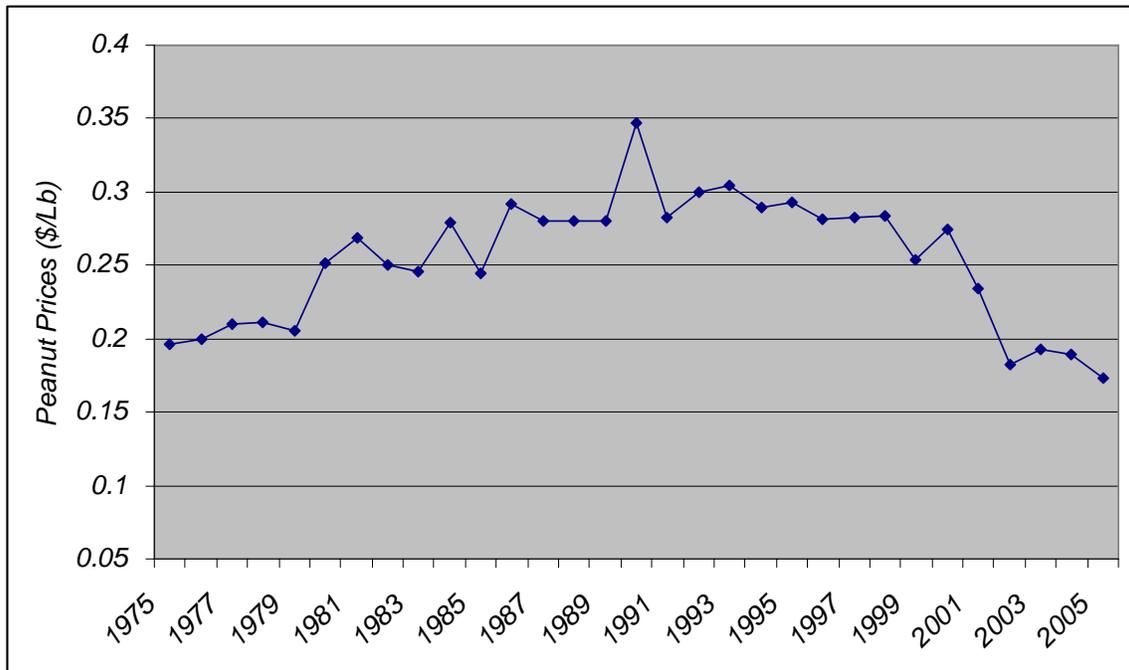
The final data set is the annual US population. This data is expressed in people and was obtained from the US Census Bureau. The data set is represented graphically in figure 4.7.

Figure 4.1: US Per Capita Peanuts Consumption (DPC) 1975-2005



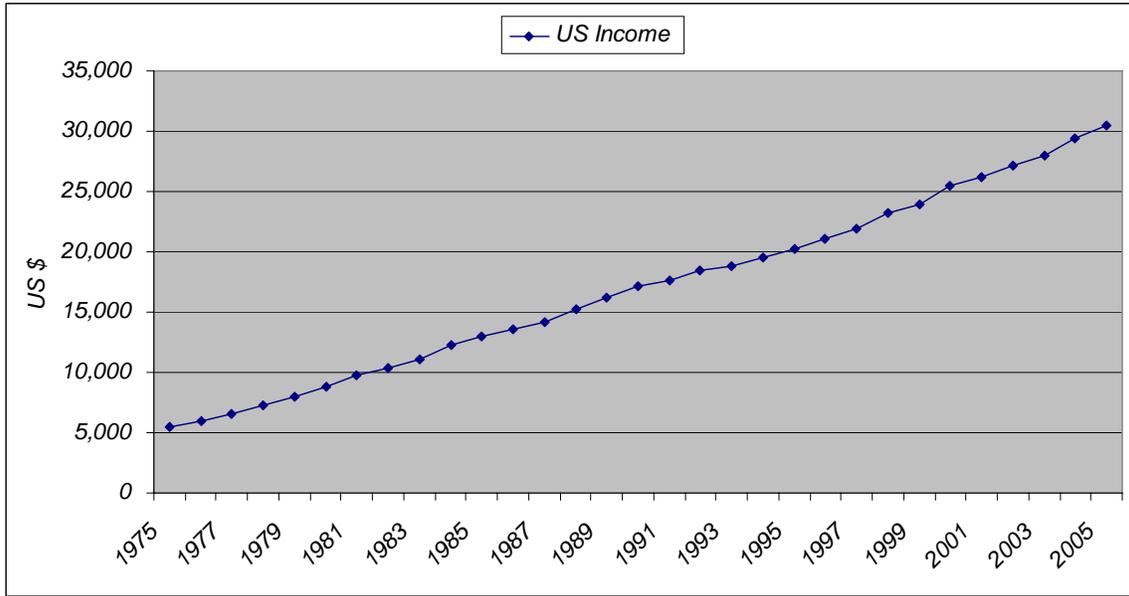
Source: National Agricultural Statistics Services, US Census Bureau

Figure 4.2: Peanuts Prices 1975-2003



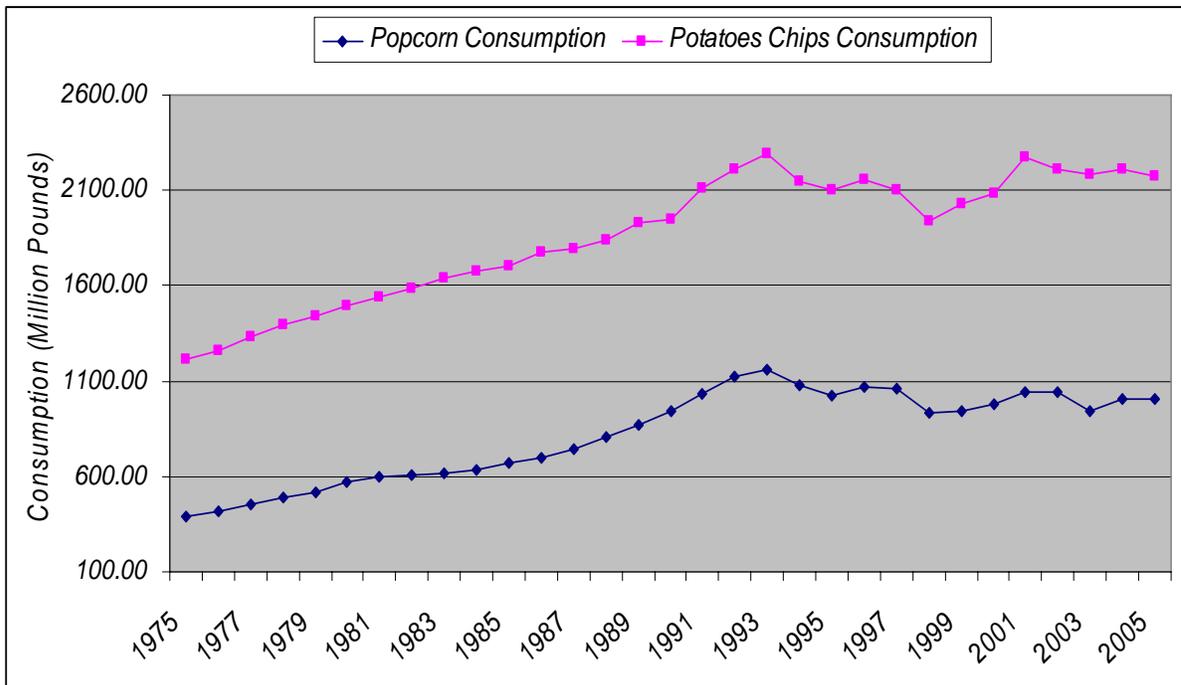
Source: National Agricultural Statistics Services

Figure 4.3: Per Capita US Income 1975-2003



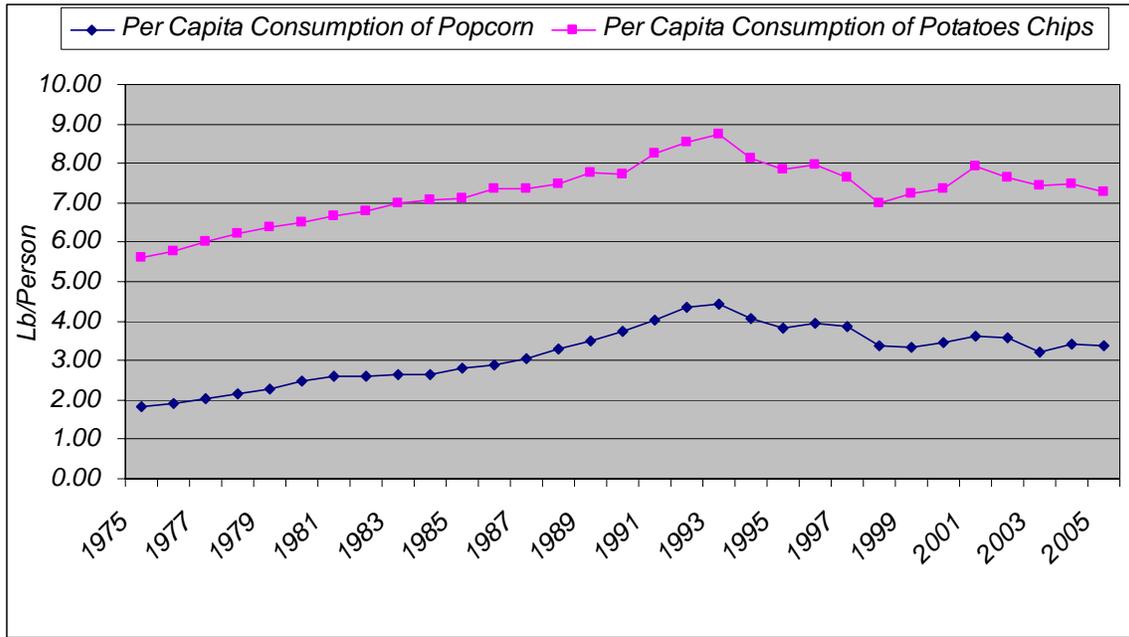
Source: Bureau of Economic Analysis (BEA).

Figure 4.4: Popcorn and Potatoes Chips Consumption



Source: National Agricultural Statistics Services, Popcorn Industry Facts

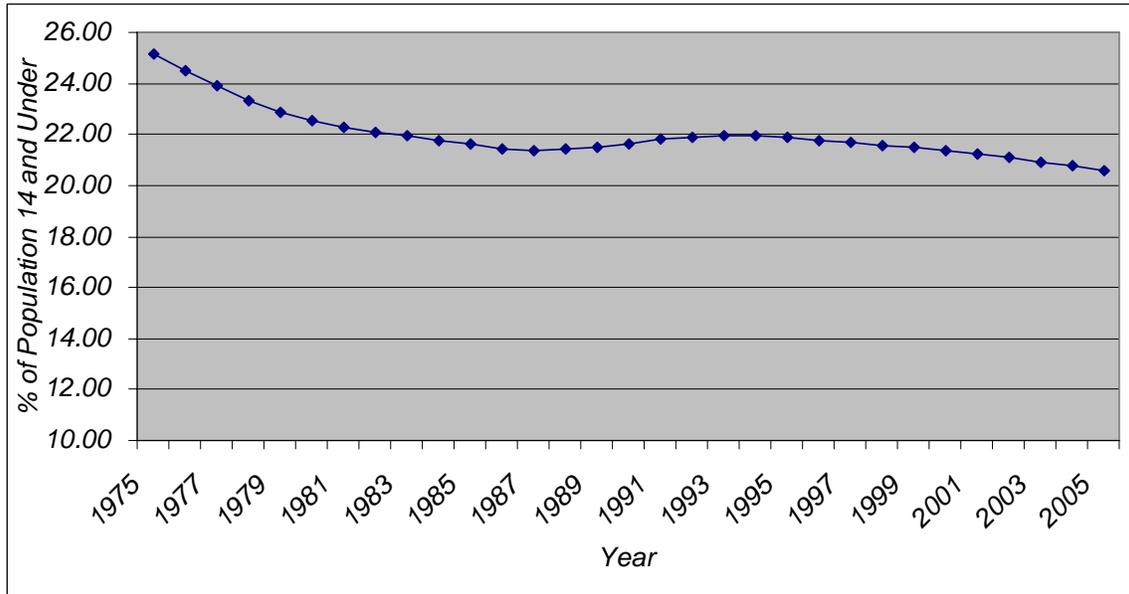
Figure 4.5: Per Capita Consumption of Popcorn and Potatoes Chips



Source: National Agricultural Statistics Services, Popcorn Industry Facts, US Census

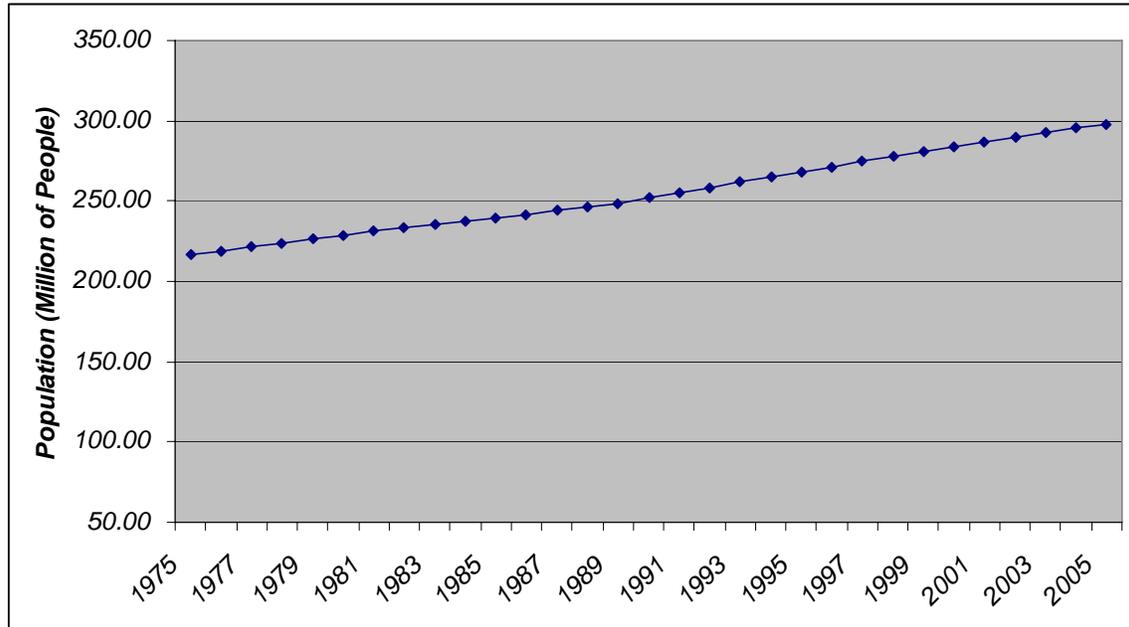
Bureau

Figure 4.6: Percentage of US population Aged 0-14



Source: US Census Bureau

Figure 4.7: US Population 1975-2005



Source: US Census Bureau

Table 4.1 displays the results of the descriptive statistics for the snack industry variables used in this research. Comparing mean, minimum and maximum consumption for peanuts, popcorn and potatoes chips makes it possible to see which commodity has varied the most during the 31 years period. The minimum consumption for popcorn and potatoes chips are respectively 708 and 269 million pounds below minimum peanuts consumption and the maximum consumption for popcorn and potatoes chips are respectively 810 and 728 millions pounds below maximum peanuts consumption. Although the data indicates that over the years more peanuts have always been consumed as food than popcorn and potatoes chips, there has been a greater variability in the consumption of popcorn and the least variability in the consumption of potatoes chips. Popcorn has the highest coefficient of variation followed by peanuts and potatoes chips. This indicates that of the three food products, there has more variability around the average consumption of popcorn.

Table 4.1: Summary Statistics for Industry Variables

<i>Descriptive Statistics</i>	<i>DPC</i>	<i>PCC</i>	<i>POP</i>	<i>PP</i>	<i>PCI</i>	<i>AG</i>	<i>PO</i>
	<i>(Million Pounds)</i>	<i>(Millions Pounds)</i>	<i>(Millions Pounds)</i>	<i>(US \$)</i>	<i>(US \$)</i>	<i>(%)</i>	<i>(Millions)</i>
Mean	1537.06	1043.06	821.08	0.25	16990	21.97	255.06
Median	1557.14	1051.15	934.13	0.27	17108	21.78	251.89
Minimum	1101.50	823.59	393.00	0.17	5489	20.56	217.10
Maximum	1968.42	1240.47	1158.00	0.35	30509	25.17	298.05
Std Dev	203.75	105.50	237.48	0.04	7461	1.03	25.05
Co of Var	0.13	0.10	0.29	0.17	0.44	0.05	0.10

Source: National Agricultural Statistics Services, Popcorn Industry Facts, US Census Bureau, Bureau of Economic Analysis (BEA).

Over the years of the research, US income grew significantly, presenting the highest coefficient of variation 0.44. However, this growth in income did not significantly reflect on the consumption of peanuts and others snacks mentioned in the study. On the other side, even though the US population presented a consistent growth as indicated in figure 4.7, the percentage of children in the population consistently declined throughout the years of this study, with an upward spike between 1987 and 1997 (Figure 4.6). The regression model will indicate how much impact this decline has had on peanut consumption.

Figure 4.2 indicates that from 1975 to 1991 peanut prices rose consistently then followed a consistent decline from 1991 and reaching the lowest of \$0.17 in 2005.

Table 4.2: Correlation of Industry Variables

	<i>DPC</i>	<i>PP</i>	<i>PCI</i>	<i>POP</i>	<i>PCC</i>	<i>PO</i>	<i>AG</i>
DPC	1						
PP	-0.06	1					
PCI	0.87	-0.03	1				
POP	0.73	0.37	0.86	1			
PCC	0.84	0.04	0.89	0.82	1		
PO	0.84	-0.04	1	0.85	0.88	1	
AG	-0.78	-0.24	-0.79	-0.72	-0.87	-0.77	1

There is a positive correlation between peanut consumption and income, popcorn consumption, potato chips consumption and population. This suggests that peanut consumption and all these variables all move in the same direction. While the correlation between peanut consumption and price is small and negative, both parameters move in opposite direction; as the price increase, consumption decreases. The weak correlation between peanut prices and income, popcorn consumption, potato chips consumption, population and age suggest that the statistical relationship between those parameters is somewhat random (Table 4.2)

Even though the linear model fit the expectations well, the double log model provided the best overall fit based on the estimates of R^2 , F-Value and t- values (Table 4.3). Running the model with per capita values resulted in auto correlation, with a Durbin - Watson statistics of 0.83. In contrast, running the double log model with total consumption values, i.e. without per capita values resulted in a Durbin-Watson statistic of 1.82 and this means absence of autocorrelation.

Peanut prices, popcorn consumption, potato chips consumption and population all have a negative correlation with the dependent variable while income and age have a positive correlation with the dependent variable. This explains the fact that declining peanut prices between 2001 to 2005 must have somewhat contributed to the slight rise in consumption.

The adjusted R^2 for the model is 0.852, which indicates that 85% of the variability in peanut consumption is explained by the six independent variables in question. A change in each of the independent variables has a different impact on peanut consumption.

Model results indicate that a one percent increase in peanut price will lead to about 0.50 percent decrease in peanut consumption in the US. With a P value that is ≤ 0.01 , we are 99% certain that this coefficient explains variability in peanut consumption. A t stat of 4.74 indicate a great likelihood that peanut price coefficient is significantly different from zero.

A one percent increase in income in the US will lead to a 1.810 percent increase in peanut consumption. The P value for income is ≤ 0.01 so; it is 99% certain that this coefficient explains variability in peanut consumption. With a t-stat absolute value of 4.52, the income coefficient is significantly different from zero. The model shows that an increase in income results in an increase in peanut consumption; this fact suggests that peanut is a normal good with a positive income elasticity of demand. It makes sense since for all normal goods, a price drop results in an increase in quantity demanded by consumers. This result agrees with the findings of (Rimal and Fletcher, 2002) who reported that income was significant in the decision of whether to consume

peanuts products and how many times to purchase. Household with higher income have a higher probability of participating in the snack peanut market. The report went ahead to indicate that those who already buy peanuts are likely to buy more as their income grew.

Similarly, the coefficient for popcorn consumption is -0.274. Thus, a percentage change in popcorn consumption will lead to a 0.274 percentage change in peanut consumption in the opposite direction. The P value is 7.626%, so, it is just a little over 92 % certain that popcorn consumption explains the variability in peanut consumption. The t stat absolute value is 1.85 and this indicates that the peanut consumption coefficient is somewhat significantly different from zero.

On the other hand, a one percent increase in potato chips consumption will lead to a 0.035 percent decrease in peanut consumption. However, a low t stat absolute value of 0.11 for this coefficient indicates that it is not significantly different from zero and a P value of 90.57% makes the null hypothesis very strong and casts doubt on the significance of potatoes consumption effect on peanut consumption. This can be because potatoes chips are regarded as high in fats snacks as well and do not represent a real substitute to snacks consumers. Also, potatoes may be seen as part of a meal rather than a snack.

A one percent increase in the US population leads to a 5.944 percent decrease in peanut consumption. This coefficient is significantly different from zero and significantly explains the variability of peanut consumption with a t stat in absolute value and a P

value respectively at 4.22 and 0.00. This result can be explained by the fact that changes in peanut consumption have not been proportional to the constant and steady increase in US population (Figure 4.7). This means that an increasing number of Americans try not to consume much peanuts because it is perceived as a food high in fat.

Finally, a one percent increase in the percentage of children aged 0 to 14 in the US the population leads to a 3.077 unit increase in peanut consumption. This coefficient is significantly different from zero and significantly explains the variability of peanut consumption with a t stat and a P value respectively at 3.03 and 0.00. As the percentage of children aged 0 to 14 increases in the population, an increase in peanut consumption will be expected as well, this result agrees with Jurenas, 2002 who reported that a decline in peanut consumption is linked with a declining number of children in the baby boomer generation.

Table 4.3 – Double Log Regression Results

Regression Statistics	
Multiple R	0.939250164
R Square	0.88219087
Adjusted R Square	0.852738588
Standard Error	0.051637344
Observations	31

ANOVA					
	df	SS	MS	F	Significance F
Regression	6	0.479206439	0.07986774	29.9532259	5.16689E-10
Residual	24	0.063993967	0.002666415		
Total	30	0.543200406			

	Coefficients	Std Error	t Stat	P-value
Intercept	114.8938677	24.20754455	4.746200818*	7.91755E-05
Peanut Prices	-0.502022314	0.125594163	-3.997178698*	0.000530678
Income	1.810679797	0.400461116	4.521487165*	0.000140229
Popcorn Cons	-0.274253565	0.148030019	-1.852688846	0.076264203
Potatoes Cons	-0.0356174	0.297502189	-0.119721472	0.90570035
Population	-5.944133163	1.407343471	-4.223654912*	0.000299004
Age	3.0771077	1.013082425	3.037371516*	0.005677501

* 99% certain that the coefficient is significantly different than 0

4.2 Fat Perception Effect on Some Snacks

We have gathered some data on some snacks that have been reported in literature to compete with peanuts snacks. Data were available for both regular and lower fat version sales of potatoes chips, popcorn and pretzels for a period of five year. However, sales data for regular and lower fat version of peanut snacks was not available

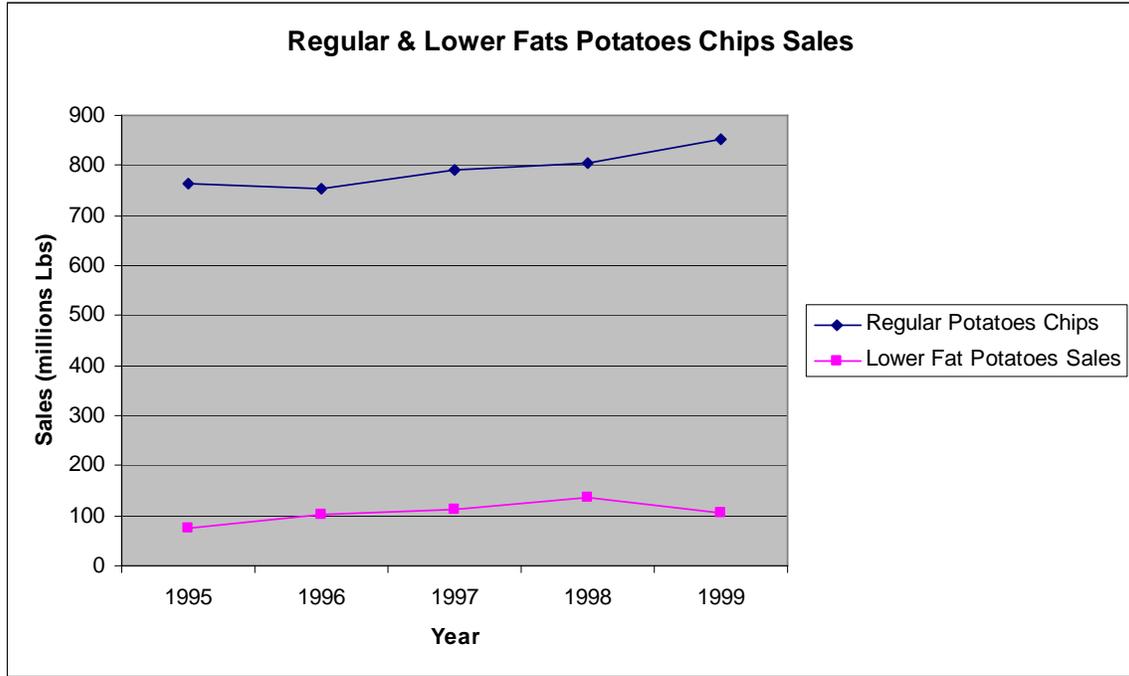
While the lack of market share growth of some snacks have been attributed to their fat content, some data indicate that lower fat snacks have not made a significant market impact either. With a price change of 10.8%, regular potatoes chips sales rose between 1995 to 1999 while lower fat potatoes chips sales first rose from 1995 to 1998 then

declined from 1998 to 1999 with a price change of 26.6 % over the 5 years period (Figure 4.8). The launching of lower fat version of potato chips did not have any negative impact on the regular potatoes chips sales.

Microwave popcorn had a consistent rise in sales of the regular version of microwave popcorn between 1996 and 1999 with a price change of 2.9%, while lower fat microwave popcorn sales consistently declined within the same period with a price change of 4.5% (Figure 4.9).

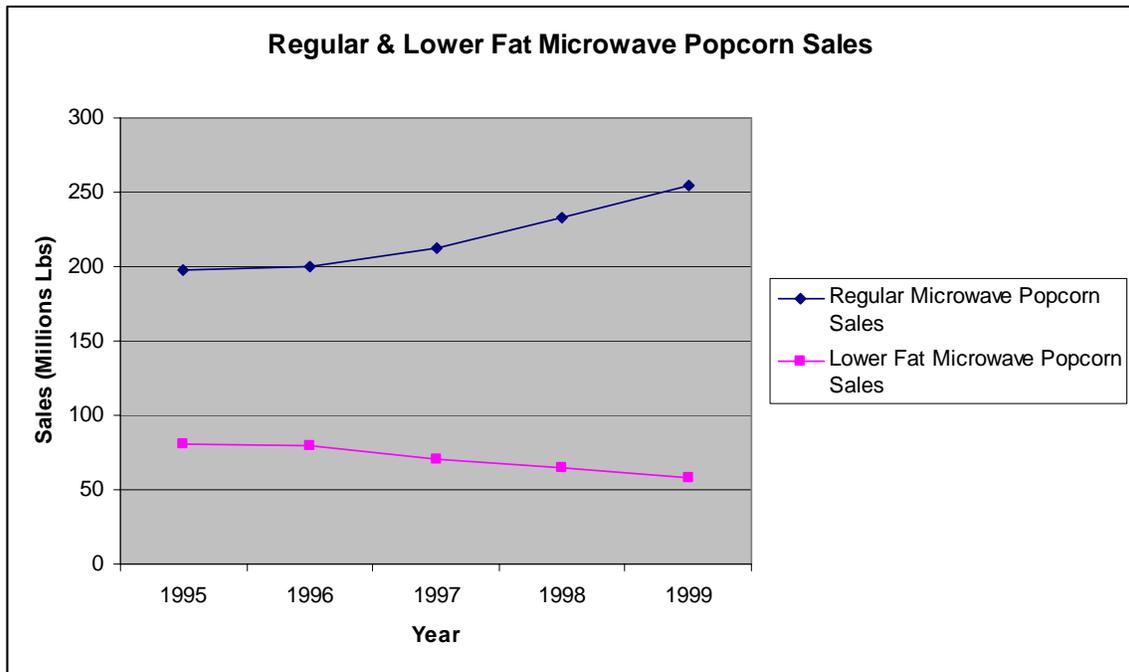
In figure 4.10, even though lower fat version of pretzels recorded higher sales than the regular version within the 5 years period, lower fat pretzels started a consistent decline pattern, from 1997 to 1999 with a price change of -5.8% while regular pretzels sales actually increased from 1997 to 1999 with a price change of 18.9% after an initial falling sales performance from 1995 to 1997.

Figure 4.8: Regular and Lower Potatoes Chips Sales



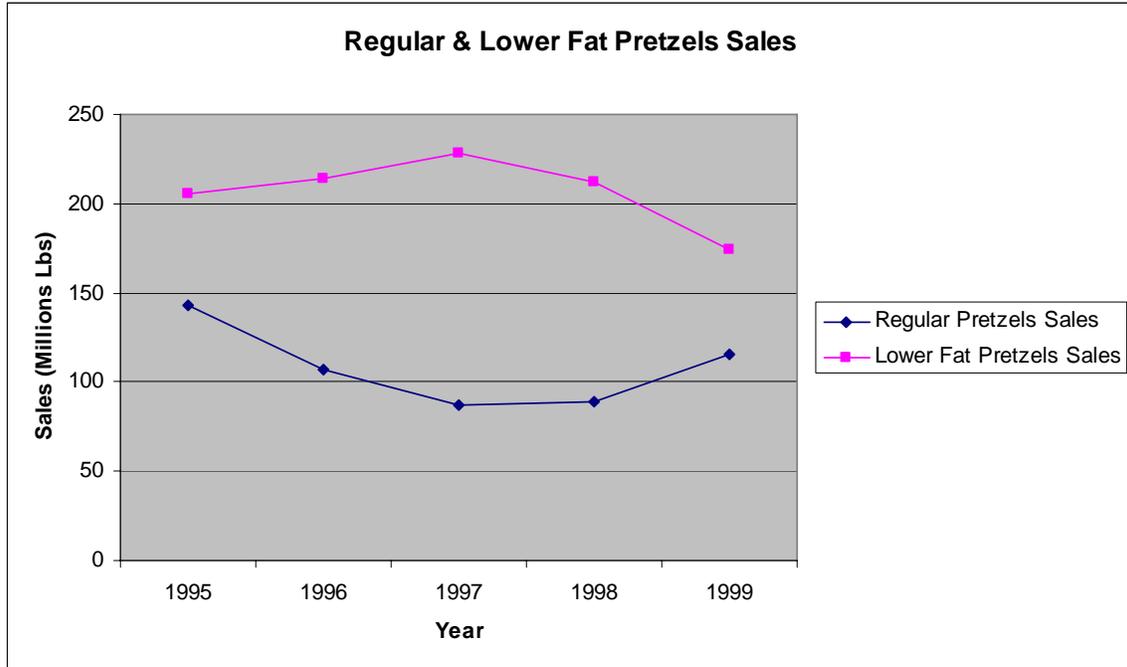
Source: Compiled by USDA's Economic Research Service, using Infoscan retail scanner data.

Figure 4.9: Regular and Lower Fat Microwave Popcorn Sales



Source: Compiled by USDA's Economic Research Service, using Infoscan retail scanner data.

Figure 4.10: Regular and Lower Fat Pretzels Sales



Source: Compiled by USDA's Economic Research Service, using Infoscan retail scanner data.

4.3 Peanut Allergies Effect on Peanut Consumption

The journal of Clinical Immunology, 2002 reported that peanut allergies increased two fold over 5-year period from 1997 to 2002. The allergies actually rose from 0.4% in 1997 to 0.8% in 2002. Peanut and tree nut allergies have therefore been on the rise in recent years, and the National Institute of Allergy and Infectious Diseases estimate that about 3 million Americans are affected annually. These numbers represent a real threat for the peanut industry because, not only will people abstain from eating peanuts but they will also abstain from eating products that come from facilities processing peanuts because of cross contamination concerns and the industry will likely take a hit from that.

Industry variables that affect peanut consumption have been analyzed as well as some statistical data, which attempt to present the effect of nutritional factors on peanut

consumption. This chapter therefore provides us with a reasonable insight into peanut consumption drivers. The next chapter provides a conclusion to our study and attempts to provide some recommendations that could be useful to the peanut industry in innovating and bringing about significant changes into the market.

CHAPTER 5: CONCLUSION AND RECOMMENDATIONS

We have critically evaluated the position of peanuts in its industry. Findings have indicated that even though there has been a slight increase in peanut consumption, over the past few years (2001 – 2005), the overall demand for peanut in the US has been sluggish. Some snacks such as potatoes chips, popcorn and pretzels have been blamed in the literature for taking market share away from peanuts but our findings indicate that while potatoes chips, peanuts snacks and popcorn have seen a slight growth in the past few years, none of those snacks has experienced a spectacular growth over those years. We have attempted in this study to evaluate variables that affect peanut consumption in the US. Data were collected for quantifiable factors for the period 1975 to 2005 from numerous sources, including US Census Bureau, Department of Labor Statistics, National Agricultural Statistics Services, Popcorn industry facts. Statistical and econometric models were then developed to analyze the data with the goal of determining the statistical significance of demographic and economic variables in our understanding of the plight of peanut consumption. This chapter provides a summary of, the results and their implications for the peanut industry in its search for growth.

Of all the modeled variables, results indicate that peanut prices, popcorn consumption, income, population and age significantly affect peanut consumption and while consumption of potatoes chips has some effect on peanut consumption; statistical test shows that the impact is not statistically significant . From the analysis of our various data, it is very unclear that peanut consumption has been flat because peanuts lost market share to others snacks such as popcorn, potatoes chips and pretzels. The reason being

that, none of these snacks has significantly gained market share during the time peanut consumption has been stagnant. Peanut prices were found in this research to be negatively correlated with consumption. Per capita US income has increased steadily from 1975 to 2005; during this time, the US population has followed the same trend and peanut consumption was found to be positively correlated with income and negatively correlated with population. As the population grew, peanuts consumption in pounds grew as well and those changes did not make any significant difference on the per capita consumption. Results indicated that age plays a significant factor in peanuts consumption. The percentage of children aged 0 to 14 in the US population is positively correlated with peanut consumption; however it should be a concern for peanut industry developers to realize that the percentage of this important consumers base has been constantly declining. While there is nothing the peanut industry can do to control this variable, they can however develop innovations to tap into any growing age group. Income as a variable was found to be positively correlated with peanuts consumption; as income grew, people tend to consume more peanuts. This indicates that peanuts are a superior good. Another concerning factor for the peanut industry here is the rate of peanut allergies in children that as actually doubled within the past 5 years, this implies another loss in that consumer base unless issues with allergies are adequately dealt with. Statistical results indicated that popcorn consumption could somewhat significantly affect peanut consumption even though 1.87 times more pounds of peanuts are currently consumed in the US than popcorn. Therefore, as people consume more popcorn, they are likely to consume less peanuts. The statistical significance level of potatoes chips

consumption effect on peanuts consumption suggested that consumers are not very eager to drop consumption of peanuts by switching to potatoes chips.

Some parameters that we were unable to model such as peanuts fat content and allergies have been reported to have significant impacts on peanut consumption. While it is obvious that those experiencing peanut allergies, will eventually try not to consume peanuts anymore, we are not quite certain that low fat content peanuts will sell better than regular peanuts in consumption. Consumption data on popcorn, potatoes chips and pretzels has indicated that, even though lower fat versions of those snacks enjoyed a growing consumption within couple of years of their introduction, consumption started a declining trend soon after that stage while the regular version of the same snacks picked up the market share they initially lost to lower fat versions. This therefore suggest that as interested to switching to low fat snacks as consumers could be, they are still very influenced by the taste and flavor of the food they paying for.

5.1 Recommendations

Based on the foregoing analyses, our first recommendation to peanut industry leaders further understand the variables influencing peanut consumption, consumers' behavior towards snack foods, fat perception and the fast rising allergies issues. The industry must more appropriately define business in terms of what consumers problems are there to solve within some broad parameters. The peanut industry must identify new sources of growth to ensure that their businesses remain viable.

Industry leaders should look at their businesses from an “outside-in” as supposed to an “inside out” point of view. Rather than starting with a set of assets and capabilities and building the business around that, companies must start with a customer directed business strategy that identifies emerging customers’ needs and develop a corresponding set of capabilities that meet these needs.

Peanut industry leaders need to pay attention to the shifts in consumers’ demographics; as children eat more peanuts, they can equally positively influence parents to do so, assuming that parents can snack on what was initially bought for kids. With a declining children population in the US, the impact on peanut consumption can therefore be a double effect impact. While it is impossible to change consumers age, it is possible to understand how taste and preference change with time and what type of products need to be developed and marketed to these age groups in order to maximize profits. In other words, the peanut industry needs to redefine and target markets more broadly.

Another recommendation is for peanut industry leaders not to leave the allergy issues up to the health care industry to deal with. An estimated 3 millions Americans are allergic to peanut and the allergies have doubled in the kids’ population for the past 5 years. It is a concern that kids, whose share of the US population is positively correlated with peanut consumption, belong to a declining population segment and are increasingly allergic to peanut. This issue can take away an important consumers base from the peanut industry if not adequately dealt with. Therefore, early work by Dr Mohamed at the North Carolina University to develop processes that will make allergens free peanuts should be funded

and completed. This innovation process should be crafted to remove the allergens from peanuts while rendering them easier to process for use as a food or food ingredient without degrading its taste, quality and nutritional attributes.

It is becoming clear that monounsaturated fat is the key to good heart health. Fatty acids are a major component in all oils, but it is the oleic form found in largest quantities in olive and canola oils that scientists believe make them healthy. Therefore, varieties of peanuts with no molecular manipulation that will possess the highest oleic fatty acids content should be developed using traditional science and marketed as a health food. Such improved healthy peanuts should be developed to yield more peanuts per acre as well, with an improved oil shelf life.

While industry analysis has indicated that, low fat versions of some food may not be the key to improved consumption; studies have proven that improved taste and flavor of some peanuts varieties can represent a significant marketing advantage. Therefore peanut industry leaders should develop innovations that will make low oil content peanuts, better taste and flavor profile and well as healthy oil profiles in order to attract new consumers with healthy life styles.

Age represented a significant variable affecting peanut consumption. The peanut industry in its search for new products that will well respond to consumers needs should identify health and dietary demands of various age groups and understand what solutions peanuts proximate ingredients could potentially provide to meet those needs. This means an

insightful exploitation of peanuts protein, carbohydrates, minerals others for a food ingredients market. This alternative can be geared towards improving utilization of peanut components in various food formulations.

The industry has to utilize marketing as a competitive communication tool to present new innovative value added products to the new consumers they seek to attract. As the peanut industry becomes more oriented to the principles of innovation, it will create a stronger position in the market and ultimately offer increased value to consumers.

The peanut industry needs to redefine business and target markets more broadly. Peanuts Companies currently compete in specific segments. However, since markets change over time and some segments shrink or disappear; leaders should periodically redefine companies businesses to take into account these changes and therefore position companies in larger markets segments. Opportunities should be created by segmenting markets based on income, demographics and related purchase behavior.

Intangible assets inherent in businesses should be recognized and leveraged to create value. Over time, companies sustain themselves by taking advantage of the knowledge base, systems, processes, brands, and customer/supplier relationship developed overtime. On the other hand, physical assets loose their value and must be replaced, particularly those that are no longer competitive. By focusing more on these intangible assets, the relative significance of the physical asset base is reduced and is less likely to drive the business strategy.

Peanut companies should define their businesses in terms of what customer problems are they trying to solve within some broad parameters. An example of this is, to naturally breed very crunchy peanuts varieties to meet the needs of consumers who are very picky about such characteristics in their snacks. The key point is, satisfying customers' needs must be the focal point of the business strategy. While focusing on operational excellence is great, peanut companies should also develop a commodity orientation and product centric philosophy.

New distribution channels should also be identified and executed. An example of this is to develop some innovative ways to make peanuts become a snack of choice in movie theaters or while watching football games.

5.2 Future Research

This research seeks to fully understand the variables affecting peanut consumption in order to address the long time consumption stability of peanuts. Available data limited the depth of analysis that could have been conducted to better address this issue. Using historical data on low fat peanuts products consumption could have provided a better indication of the fat perception effect on peanut consumption. Historical data on pretzels, popcorn, and potatoes chips prices could have greatly helped in understanding how peanuts consumption is price sensitive to these other snacks as well. Further effect that focuses on this effort will contribute significantly in helping evaluate the impact of competition on peanut consumption and therefore develop adequate strategies to better address those issues.

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