Original Paper

The U.S. Toothpaste Market: A Competitive Profile

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Abstract

This paper follows the path of seven studies (see below). However, it is different in one important respect: it also offers a benefit segmentation profile of the U.S. Toothpaste Market. Porter associates high market share with cost leadership strategy which is based on the idea of competing on a price that is lower than that of the competition. However, customer-perceived quality—not low cost—should be the foundation of competitive strategy, because it is far more vital to long-term competitive position and profitability than any other factor. So, a superior alternative is to offer better quality vs. the competition.

In most consumer markets a business seeking market share leadership should try to serve the middle class by competing in the mid-price segment; and offering quality better than that of the competition: at a price somewhat higher, to signify an image of quality, and to ensure that the strategy is both profitable and sustainable in the long run.

Quality, however, is a complex concept that consumers generally find difficult to understand. So, they often use relative price, and a brand’s reputation as a symbol of quality.

In 2008 retail sales in the U.S. were $1.27 Billion for the Toothpaste Market. The market leader Crest had a market share of 34.7%, closely followed by Colgate with a share of 33.5%. We focused on the most popular pack-size—5.8-6.5oz—which had a 45.3% share. Employing Hierarchical Cluster Analysis, we tested two hypotheses: (1) That a market leader is likely to compete in the mid-price segment, and (2) That the unit price of the market leader is likely to be somewhat higher than that of the nearest competition.

Employing U.S. retail sales data for 2008 and 2007, we found that, for both 2008 and 2007, the market leader in the U.S. Toothpaste market—Crest—was a member of the mid-price segment. Furthermore, the unit price of Crest was somewhat higher than that of Colgate, the runner-up, which was also a member of the mid-price segment.

Thus, the results fully supported both Hypothesis I and II—for 2008 and 2007.

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We also found strong support for the idea, that relative price is a strategic variable, as we have hypothesized.

We discovered five benefit segments. The most fundamental result of this analysis is that it revealed an avalanche of various brands of toothpaste that not only whitened teeth, but were also helpful in preventing tooth decay, as before.

Finally, we discovered four strategic groups in the industry.

Keywords
U.S. Toothpaste Market, cost leadership, price-quality segmentation, benefit segmentation, market-share leadership, relative price a strategic variable, strategic groups.

1. Introduction

This work follows the path of seven studies: the U.S. Men’s Shaving Cream, the U.S. Beer, the U.S. Shampoo, the U.S. Shredded/Grated Cheese, the U.S. Refrigerated Orange Juice, the U.S. Men’s Razor-Blades, and the U.S. Women’s Razor-Blades markets (Datta, 2012, 2017, 2018a, 2018b, 2018c, 2019a, 2019b). However, this research is different in one important way: that we have also been able to offer a benefit segmentation profile of the U.S. Toothpaste Market.

This research is based on the idea that the path to market share leadership does not lie in lower price founded in cost leadership strategy, as Porter (1980) suggests. Rather, it is based on the premise—according to the PIMS (Note 1) database research—that it is customer-perceived quality that is crucial to long-term competitive position and profitability. So, the answer to market share leadership for a business is to differentiate itself by offering quality that is better than that of the nearest competition (Datta, 2010a, 2010b, 2012, 2017, 2018a, 2018b, 2018c, 2019a, 2019b).

To make this idea operational requires two steps. The first is to determine which price-quality segment to compete in? Most consumer markets can be divided in three basic price-quality segments: premium, mid-price, and economy. These can be extended to five by adding two more: ultra-premium and ultra-economy (Datta, 1996, 2012, 2017, 2018a, 2018b, 2018c, 2019a, 2019b). The answer lies in serving the middle class by competing in the mid-price segment. This is the socio-economic segment that represents about 40% of households in America (Datta, 2011). It is also the segment that Procter & Gamble (P&G), a leading global consumer products company, has successfully served in the past (Datta, 2010b, 2012, 2017, 2018a, 2018b, 2018c, 2019a, 2019b).

1.1 The Strategic Importance of Price Positioning

The second step is to position the brand at a price that is somewhat higher than that of the nearest competition in the mid-price segment. This is in accord with P&G’s practice based on the idea that although higher quality does deserve a “price premium,” it should not be excessive (Datta, 2010b). A higher price offers two advantages: (1) it promotes an image of quality, and (2) it ensures that the strategy is both profitable and sustainable in the long run (ibid).

A classic example of price positioning is provided by General Motors (GM). In 1921 GM rationalized
its product line by offering “a car for every purse and purpose”—from Chevrolet to Pontiac, to Oldsmobile, to Buick, to Cadillac. More importantly, GM positioned each car line at the top of its segment (Datta, 1996, 2010a, 2017, 2018a, 2018b, 2018c, 2019a, 2019b).

A more recent and familiar example is the economy chain, Motel 6, which has positioned itself as “offering the lowest price of any national chain”. Another example is the Fairfield Inn. When Marriott introduced this chain, it targeted it at the economy segment. And then it positioned it at the top of that segment (Datta, 1996, 2017, 2018a, 2018b, 2018c, 2019a, 2019b).

1.2 Close Link between Quality and Price

As mentioned above, customer-perceived quality is the most important variable contributing to the long-term success of a business. However, quality cannot really be separated from the price (Datta, 1996). Quality, in general, is an intricate multi-dimensional concept that is difficult to understand. So, consumers often use relative price—and a brand’s reputation—as a symbol of quality (Datta, 2010b, 2012, 2017, 2018a, 2018b, 2018c, 2019a, 2019b).

2. History of Brushing Teeth and Toothpaste

2.1 Teeth-cleaning Twig or Datun

Brushing with a teeth-cleaning twig from a tree can be helpful in preventing tooth decay and gum disease. Its use dates all the way back to 3500-3000 BC, when Babylonians and Egyptians made a toothbrush by chewing a twig until one end is frayed, while the other end could then be used as a toothpick. It was around 1600 BC that the Chinese developed chewing sticks which were made from aromatic tree twigs to freshen breath. According to Buddhist scriptures, chewing sticks—called datun—were in use in Northwestern India around the 5th century BC (Note 2, Note 3).

The most common plants used for twigs are those with a high tannins content: meaning that they possess astringent and antibacterial qualities that promote healthy gums and teeth (Note 3).

In India the most common chewing sticks are neem twigs. Neem has strong anti-bacterial and anti-microbial properties. That is why brushing with neem datun is still very popular in small towns and rural India (Note 3). It is effective in “fighting germs, maintaining the alkaline levels in your saliva, keeping bacteria at bay, treating swollen gums, preventing plaque and also giving you whiter teeth” (Sengupta, 2018; italics added; also Note 4).

2.2 The Natural-Bristle Toothbrush

The Chinese are believed to have invented the first natural-bristle toothbrush made out of bristles from pig’s necks. The first precursor to modern toothbrush was invented by William Addis in England around 1780. While the handle was carved out of cattle bone, yet the brush was still made from swine bristles (Note 2).

2.3 The Nylon Toothbrush

With the invention of nylon by Du Pont in 1938, the first toothbrush made with nylon yarn went on sale on February 24, 1938. The Broxodent, a Swedish invention, was the first electric toothbrush that
appeared in the U.S. in 1960 (Note 5).

Today both manual and electric toothbrushes come in several shapes and sizes, and most are made of plastic-molded handles and nylon bristles (Note 2).

2.4 Early History of Toothpaste

Egyptians are said to have started using a toothpaste to clean their teeth around 5,000 BC. This was a time before toothbrushes were invented. Ancient Greeks and Romans are also believed to have used toothpaste, and the Chinese and Indians, too, were using toothpaste around 500 BC (Note 2).

Ancient toothpastes were intended to treat some of the same concerns that we have today: keeping teeth and gums clean, whitening teeth and freshening breath. The ingredients of ancient toothpastes were however quite different. For example: (1) A powder of ox hooves’ ashes and burnt eggshells that was combined with pumice, (2) The Greeks and Romans preferred more abrasiveness and their toothpaste ingredients included crushed bones and oyster shells, (3) The Romans added more flavoring to combat bad breath as well as powdered charcoal and bark, (4) The Chinese used a wide variety of ingredients in toothpastes. Over time these included ginseng, herbal mints and salt (Note 2).

The development of toothpastes in more recent times began in the 1800s. Early versions contained soap, and in the 1850s chalk was added. Betel nut was included in toothpaste in England in the 1800s, and in the 1860s a home encyclopedia described a home-made toothpaste that used ground charcoal (Note 2).

2.4.1 The Pioneering Role of Colgate

Prior to the 1850s, “toothpastes” were usually powders. During the 1850s, a new toothpaste in a jar called Crème Dentifrice was developed. In 1873 Colgate started the mass production of toothpaste in jars (Note 2).

In 1911 Colgate distributed two million tubes of toothpaste and toothbrushes to schools, and provided hygienists to demonstrate tooth brushing (Note 6).

In the early years of the twentieth century Colgate did more than any other company to promote toothpaste (Miskell, 2004).

2.4.2 Colgate Introduces Toothpaste in a Collapsible Tube

In 1896 Colgate introduced a toothpaste in a collapsible tube similar to contemporary toothpaste tubes (Note 6). At that time a jar of toothpaste cost a manual worker half a-day’s wage. The collapsible tube not only cut down the cost of producing toothpaste significantly, it also eliminated the unhygienic practice of scooping the paste from shared jars onto a toothbrush. Later, another innovation by Colgate made it possible for toothpaste to come out in a flat “ribbon” that would not easily fall off the brush (Miskell, 2004).

This packaging innovation by Colgate turned out to be critical in stimulating mass production and consumption of toothpaste because consumers found toothpaste in a collapsible tube so easy to use (ibid).
2.5 History of Brushing by Americans

Surprisingly, most Americans did not brush their teeth until after WWII. When the Army soldiers returned home after the war, they brought with them the habit of regular brushing: a practice the Army had made obligatory (Warner, 2014; Bellis, 2018).

No wonder dental cavities had become a big health problem in America at that time.

A similar phenomenon happened to shaving by men before WWI. Then, a two-day stubble was quite common among American men. However, during WWI American military began to issue Gillette shaving kits to every U.S. serviceman. When the soldiers returned home after WWI, the required habit of clean shaving acquired by millions of servicemen broke down any lingering resistance to self-shaving among the civilian men (Datta, 2019a).

3. A Brief History of the Sugar Industry

It was around 400 B.C. that sugar production started in India (Note 7). In his second voyage across the Atlantic in 1493, Christopher Columbus carried sugarcane stalks from the Spanish Canary Islands (Muhammad, 2019). The Portuguese introduced sugar to Brazil in the middle of the 16th century. After 1625 the Dutch brought sugarcane from South America to the Caribbean islands where it was cultivated from Barbados to Virgin Islands (Note 8).

3.1 Slavery and the Sugar Industry

For thousands of years sugarcane was a heavy and unwieldy crop that was very labor-intensive. It was the introduction of slavery that changed everything. “The true Age of Sugar had begun—and it was doing more to reshape the world than any ruler, empire, or war had ever done”. Over the four centuries following the arrival of Columbus in the New World, innumerable lives were destroyed and around 11 million Africans were enslaved” (Muhammad, 2019; italics added).

The manufacture of sugar from sugarcane began in Louisiana Territory in 1795. Within decades, Louisiana planters were producing as much as a quarter of the world’s cane-sugar output. However, this impressive achievement was the fruit of a bitter harvest grown on the backs of enslaved labor. In sugar mills, children, alongside with adults, “toiled like factory workers with assembly-like precision and discipline under the constant threat of boiling hot kettles, open furnaces and grinding rollers” (ibid).

To attain the highest efficiency—like the round-the-clock Domino refinery today—sugar factories worked day and night. On cane plantations there is no distinction as to the days of the week. Fatigue might mean losing an arm to the grinding rollers, or being flayed for not being able to keep up. Resistance was often met with sadistic cruelty (ibid; italics added).

Louisiana led America in destroying the lives of black people: all in the name of efficiency. Life expectancy on a sugar plantation was less like that on a cotton plantation, but more that on a Jamaican cane field, where the “most overworked and abused could drop dead after just seven years” (ibid; italics added).
3.2 The Birth of High Fructose Corn Syrup (HFCS)

In the early 1970s the Nixon administration told American farmers that the government would pay them for all the corn they could produce. This policy of cheap corn led to considerable increase in the production of corn, which, in turn, drove the price of corn down. This policy led to an unintended consequence that was monumental in scope. Now a new kind of sweetener—High Fructose Corn Syrup (HFCS)—became much cheaper to produce than sugar. More importantly, the consumers couldn’t tell the difference between the two (Pollan, 2009, p. 80; also, Datta, 2017).

In 1980 Coca Cola and Pepsi switched over from sugar to HFCS. But, instead of reducing cola prices Coke and Pepsi chose a different path: increase the size of the cola bottle (ibid).

Since then HFCS have become the chief source of sweeteners in our diet (Pollan, 2006, p. 103).

3.3 The Insatiable American Craving for Sugar

In colonial Maryland more than 300 years ago the governor’s wife died. Her coffin was made out of expensive lead; her wrists were bound with silk ribbons. But one of the “most telling signs of her wealth was her teeth”—or lack thereof. She had lost 20, and many others had decayed right down to the root stubs. One reason her mouth was in such bad shape was that “she was affluent enough to afford sugar” (Gritz, 2017; italics added).

We have been “hardwired by natural selection” to desire sweet foods (Pollan, 2008, p. 112). Yet, earlier Americans could not get enough because sugar then was a luxury item. During the time of George Washington—who wore false teeth—Americans consumed just six pounds of sugar per year (Gritz, 2017). By the middle of the twentieth century, sugar became much more affordable, thanks to its mass production. Consequently, the per capita consumption of sugar jumped to 100 pounds per year (Miskell, 2004).

Today the average American consumes 130 pounds of sugar every year, much of it in the form of the cheap HFCS. Sugar has become so pervasive today that most of it is consumed by lower-income Americans. According to a 2013 Gallup poll, Americans with an income of less than $30,000 per year are more than twice as likely to drink regular soda that those earning more than $75,000 per year (Gritz, 2017).

3.4 Sugar and Dental Cavities

It is commonly known that sugar can lead to tooth decay, but not many understand how it happens. The mouth is populated by a myriad of bacteria many of which are beneficial to oral health. However, some harmful bacteria feed on the sugars we eat that create acids that destroy the tooth enamel. This in turn leads to cavities that cause holes in the teeth (Note 9).

Acids leech minerals from the teeth through a process known as demineralization. Luckily, the natural process of remineralization replenishes these minerals that strengthen the teeth back again. The vital factor in this process is saliva that contains minerals like calcium and phosphates that help repair weakened enamel. Another mineral is fluoride that can aid in repairing damaged enamel (Note 10).
4. Industrialization of American Food and Dental Decay

An important reason for processing food is the need to preserve it. However, industrial processing goes far beyond extending food shelf life. Instead, it is particularly calculated to “sell us more food by pushing our evolutionary buttons—our inborn preferences for sweetness and fat and salt” Pollan (2008, pp. 149-150; italics added; also, Datta, 2017).

4.1 From Whole Foods to Refined

Humans have been refining cereal grains at least before the industrial revolution with a preference for white flour. So, white flour acquired an aura of prestige. The introduction of steel rollers in 1870 marks the beginning of the industrialization of our food (Pollan, 2008, p. 107).

Before the steel rollers, wheat flour was produced by grinding wheat between two large stone wheels. But this process produced flour that was far from being white. This is because that while stone grinding removed the bran—the part that contains fiber—from the wheat kernel, it could not separate the germ: the component that contains volatile oils that are rich in nutrients. This operation produced two important results: (1) The flour acquired a yellowish gray tint, and (2) It shortened the flour’s shelf life, because the oil once exposed to the air soon oxidized and turned rancid (Pollan, 2008, pp. 107-108).

With the invention of steel rollers, it became possible to remove the germ—the component rich with nutrients—and then grind the remaining part—endosperm—into a an extremely fine powder. Now everyone could afford snowy-white flour that could stay on a shelf for months (Pollan, 2008, p. 108). Ironically, the problem was that this “gorgeous white powder was nutritionally worthless or nearly so” (ibid; italics added).

The roller milling process not only removed wheat germ—and its nutrients—but also the fiber, leaving behind nothing but starch and a little protein (Note 11) Starches made from white flour are carbohydrates that can linger in your mouth and then break down into simple sugars. Bacteria feed on these sugars and produce acid, which causes tooth decay (Note 12).

Research during the early years of the twentieth century revealed that where people ate coarser dry bread had much lower incidence of cavities, than people who ate soft white-flour bread. This is because the coarser bread stimulated secretion of saliva which contains alkaline properties that neutralize acids in the mouth (Miskell, 2004).

Pollan (2008, pp. 9-10) suggests that four of our leading chronic diseases—coronary heart disease, diabetes, stroke and cancer—can be traced directly to industrialization of our food, which he calls the Western diet. Among the key factors contributing to these diseases are the rise of highly processed foods, refined grains, and the “superabundance of cheap calories of sugar and fat produced by modern agriculture” (italics added).

However, studies of native populations not exposed to the Western diet, reveals a different picture. In the early decades of the twentieth century, several medical professionals working with native populations in several countries found almost complete absence of these four chronic diseases that afflicted Western societies at that time (Pollan, 2008, pp. 90-91).
But more importantly, as far as this study is concerned, they had little or no tooth decay as well (ibid).

5. The Modern History of the U.S. Toothpaste Industry

5.1 P&G Launches Crest Toothpaste with Fluoristan

In the early 1940s Procter & Gamble (P&G) started a research program to discover ingredients that when added to a toothpaste would decrease tooth decay. Then Americans developed about 700 million cavities a year. That made dental disease one of the most common health problems in America (Note 13).

In 1950 P&G created a joint research project, led by Dr. Joseph Muhler of the University of Indiana, to develop and test a toothpaste with fluoride. A clinical study found 49% reduction in cavities in children with ages between 6-16 years, with almost identical results among adults (Note 13; also see Miskell, 2004).

In view of such encouraging results, P&G launched Crest with Fluoristan nationally in 1956. In 1960 Crest became the first brand of toothpaste to earn an endorsement from the American Dental Association. As a result, Crest’s sales nearly tripled, pushing it well ahead of the best-selling toothpaste in the United States. In 1976, the American Chemical Society recognized Crest with fluoride as one of the 100 greatest discoveries of the previous 100 years (Note 10).

P&G launched Gleem toothpaste in 1953, and soon it was able to garner a market share of 20 percent (Miskell, 2004). However, after the introduction of Crest in 1955, Gleem began to lose its popularity. Finally, in 2014 P&G discontinued it (Note 14).

5.2 Colgate Palmolive Co.

In 1953 Colgate-Palmolive Co. became the company’s official name.

In 1963 Colgate added MFP Fluoride to reduce cavities. In 1997 Colgate introduced Total toothpaste, and quickly it became the market leader (Note 14). In 2018 Colgate introduced the next generation of Colgate Total toothpaste which contains a new stannous fluoride formula that “fights plaque-causing bacteria on 100% of mouth surface, including teeth, tongue, cheeks, and gums” (italics added) (Note 15).

5.3 Glaxo SmithKline and Aquafresh

Glaxo SmithKline is a British multinational pharmaceutical company that was formed as the result of a merger of Gaxo Wellcome and SmithKline Beecham in 2000 (Note 16). SmithKline Beecham introduced Aquafresh toothpaste in 1973. Aquafresh was the first striped toothpaste. Originally, it had two colors: blue and white. But later a third red stripe was also added (Note 17).

According to the company Aquafresh was the first brand to offer ‘freshness’ as a major product benefit. This is because “fresh breath” and “good-tasting” toothpastes were important to young people and families at that time (Note 18).

5.4 Glaxo SmithKline and Sensodyne

Sensodyne was introduced in 1961 by Block Drug, a Brooklyn, New York-based company, which was acquired by Glaxo-SmithKline in 2000 (Note 18). Sensodyne is targeted at people with sensitive teeth (Note 19).
5.5 Church & Dwight and Arm & Hammer Toothpaste

Church & Dwight—maker of Arm & Hammer (A&H) baking soda—entered the U.S. toothpaste market in 1989 in a joint venture with Occidental Petroleum. In a brilliant advertising campaign during the prior decade, A&H had dramatically raised consumer awareness of its baking soda as a refrigerator deodorant and freshener. Also baking soda had a long-standing reputation as an effective dentifrice. Furthermore, A&H had access to mass marketing channels through the distribution of A&H baking soda (Datta, 1996). So, exploiting these rich resources, A&H successfully launched its Dental Care brand in 1989. Following the A&H’s example, now almost every brand offers a baking soda toothpaste (ibid). Thus, A&H created a new benefit segment that the Big Two—Crest and Colgate—had ignored up to that point (ibid).

5.6 Rembrandt the First Whitening Toothpaste in America

Rembrandt introduces the “first-ever whitening toothpaste” in America in 1989 (Note 20).

6. Benefit Segmentation of the U.S. Toothpaste Market: The White-Teeth Revolution

There are two ways to look at market segmentation: demand-side and supply-side. Traditionally, much of the marketing literature views market segmentation from the demand side focusing on people or customer characteristics, such as, demographics, sociographics, or psychographics. On the other hand, there is supply-side segmentation that centers on product characteristics, such as price-quality segmentation, physical product attributes, product quality or benefits, and so on (Datta, 1996). However, starting with product characteristics is both an easier and more actionable way of segmenting markets than the traditional demand-oriented approach followed in the marketing discipline (ibid).

As mentioned above, one of the important attributes of the product-characteristics approach is benefit segmentation. We are fortunate to have access to three studies of benefit segmentation of the U.S. Toothpaste Market. Now let us see how they have addressed this issue.

Miskell (2004) recognizes two broad benefit segments: (1) Therapeutic, and (2) Cosmetic.

Haley (1968) has identified four benefit segments: (1) Decay prevention, (2) Brightness of teeth, (3) Flavor, product appearance, and (4) Price.

Datta (1996) discovered five benefit segments: (1) Dental Health, (2) Appearance, (3) Aesthetics, (4) Taste, Color, and Convenience, and (5) Low Price.

There are two main differences between Haley’s and Datta’s views. One is the latter’s recognition of the Aesthetics segment which came into being when Tom’s of Maine launched its toothpaste with natural ingredients in 1970, as we have mentioned later—and more importantly—when Arm & Hammer entered the market with a baking soda toothpaste in 1989. Second, Haley characterizes one of his four segments” as “Price”, meaning “brands on sale”. However, Datta calls the same segment as the “Low Price” segment which includes brands that are competing in the economy segment.
6.1 The White-Teeth Revolution
As we have indicated before, Rembrandt was the first brand to offer a whitening toothpaste in the U.S. in 1989. In 1993 Unilever nationally introduced Mentadent, a peroxide-baking soda whitening toothpaste. At that time American Dental Association and Consumer Reports questioned the safety of bleaching toothpaste that contained peroxide. In response to this criticism, Unilever argued that the risk of peroxide in Mentadent was no higher than in “your pickle” (Datta, 1996). Unilever discontinued Mentadent in 2016 (Note 21).

In 2001 Colgate launched Colgate Total Plus Whitening toothpaste. At that time, it was the first and only whitening toothpaste approved by the U.S. Food and Drug Administration to prevent gingivitis and plaque. Also, it was the only toothpaste that won the Seal of Acceptance from the American Dental Association for helping to prevent cavities, gingivitis, plaque, tartar build-up—and whiten teeth (Note 22).

In 2003 Colgate introduced Simply White Whitening (SWW) toothpaste. Unlike ordinary whitening toothpastes—that only remove surface stains—SWW “removes deep and embedded stains that are below the surface”. Colgate claims it can provide noticeably whiter teeth in as little as 14 days (italics added). Colgate says that SWW works because it has hydrogen peroxide and a unique, patented whitening accelerator that goes beneath the surface to whiten deeper and removing stains embedded inside the teeth. It also features high-cleaning silica to remove surface stains (Note 23).

In October 2019, Colgate came out with its newest offering: Optic White Renewal Toothpaste (Note 24). Colgate says it is “our best whitening toothpaste ever”. It contains “3% hydrogen peroxide, a professionally recommended whitening ingredient proven to deeply whiten beyond surface stains”. With “unprecedented whitening power”. it can remove “10 years of yellow stains while being safe for enamel” (italics added; Note 25).

Crest started adding whitening ingredients to its toothpastes in the 1990s. However, it introduced a new innovation: Crest Whitestrips in 2000 (Note 26).

In 2012 Crest launched Crest 3D White Glamourous White whitening toothpaste. According to P&G, this toothpaste uses a “breakthrough shine technology that noticeably brightens your smile after just one brushing”, and that it also “removes up to 90 percent of surface stains in just five days” (italics added; Note 27).

It seems that the two early Colgate whitening toothpastes—introduced in 2001 and 2003—opened the floodgate of whitening toothpaste in America, as whitening toothpaste sales catapulted to 68% of total U.S. retail toothpaste sales in 2008!

In Figure 1 we present a 2008 profile of benefit segments of the U.S. Toothpaste market that recognizes five segments.

6.2 Benefit Segments: 2008 vs. 1996

In Table 1 we present a benefit-segmentation profile of the U.S. Toothpaste market. Here are the highlights:
• Miskell (2004) points out that between 1955-1985 the toothpaste advertising was focused more on cavity protection than on “cosmetic perfection”. The data for 1996 in Table 1 shows a similar pattern with dental health accounting for 59% of toothpaste sales.

• In 1996 America had just two minor whitening brands with a 2% market share, and no toothpaste had received the seal of acceptance from the American Dental Association (ADA). However, the dam burst after Colgate was able to secure ADA’s blessing in 2001 for its Total Plus Whitening toothpaste, as we have just mentioned. In 2008 all brands—except Tom’s of Maine’s Natural Care, and Colgate’s Viadent—offered whitening toothpastes that accounted for a stunning 68% of total retail sales (Table 1, Note 2).

• The other significant difference between the two years is a huge drop in the “taste, color, and convenience” segment from 21% in 1996 to 3% in 2008. One important factor in this monumental decline seems to be the overwhelming consumer interest in white teeth over the years leading to 2008. In 1996 Aquafresh striped toothpaste had a 12.5% share. But in 2008 its share had dropped to 7.1%. Similarly, Aim gel toothpaste had a market share of 7% in 1996, but in 2008 it could muster just 0.7%. The lofty level of 68% for whitening toothpaste sales in 2008 may erroneously suggest a heavy tilt towards cosmetics by the toothpaste industry: away from its traditional concerns about dental decay. However, that is far from true. As mentioned above, ADA’s seal of acceptance for Colgate’s Total Plus Whitening toothpaste in 2001 did not only approve the brand as a whitening agent, but also found it helpful in preventing cavities, gingivitis, plaque, and tartar build-up.

So, today’s consumers have now become the beneficiaries of a situation in which they can keep the proverbial cake, but also be able to eat it!

6.3 Ingredients in Toothpaste

Until after 1945, toothpastes contained soap. After that time, soap was replaced by sodium lauryl sulphate (SLS). It is a common ingredient in present-day toothpastes. SLS is normally used as a surfactant, or foaming agent, and also as an emulsifier. An emulsifier helps oil- and water-based ingredients in a toothpaste—that do not mix—to stay mixed. It helps to properly disperse the ingredients during brushing, and ensures easy rinsing and removal of debris, i.e., food particles (Note 28).

In a recent report Consumer Reports lists the characteristics that should be in a toothpaste (Consumer Reports, 2019):

• A toothpaste bearing the seal of acceptance from the American Dental Association (ADA) means that it must be safe, it must contain fluoride, and should not contain any ingredients that cause dental decay, or harm the teeth.

• Abrasives like calcium carbonate and modified silica help in removing food debris and surface stains.

• Baking soda shows “some promise for reducing plaque”, and may “slightly decrease gum bleeding with gingivitis” (italics added)
• Desensitizers such as sodium citrate, casein phosphopeptide, and potassium may help reduce uncomfortable sensitivity.

• Fluoride is usually of two kinds: sodium and stannous. It is effective in reducing cavities by 20-30 percent. Stannous fluoride may also be helpful in sensitivity and gum inflammation.

• Sodium Lauryl Sulphate (SLS) is called a detergent, but it does not have much cleaning power. Instead, it generates foam to help push the toothpaste into nooks and crannies.

• Basic whiteners include hydrogen peroxide which chemically lightens teeth, and sodium hexametaphosphate that is supposed to help with enamel staining. But experts point out that they aren’t concentrated enough, or remain in contact with tooth surfaces long enough, to make a noticeable difference.

7. The U.S. Toothpaste Market—Price-Quality Segmentation Profile

This study is based on U.S. retail sales for 2008 and 2007 (Note 29). The data includes total dollar and unit sales, no-promotion dollar and unit sales, and promotion dollar and unit sales (Note 30).

The U.S. retail Toothpaste sales for 2008 were $1.27 Billion with two major competitors: Crest with a market share of 34.7%, and Colgate with 33.5%.

We found toothpaste packs from 0.2 to 30.4 oz. The 5.8-6.5 oz pack was by far the most popular with a 45.3% share. So, we have focused cluster analysis on this pack.

7.1 Hierarchical Clustering as the Primary Instrument of Statistical Analysis

We have used cluster analysis as the primary statistical tool in this study. As suggested by Ketchen and Shook (1996), we have taken several steps to make this effort as objective as possible:

• First, this study is not ad-hoc, but is grounded in a theoretical framework, as laid out below.

• Second, we are fortunate that we were able to get national sales data for our study for two years. Thus, this data provided a robust vehicle for subjecting cluster consistency and reliability to an additional test.

• Third, we wanted to use two different techniques—KMeans and Hierarchical—to add another layer of cluster consistency and reliability. However, we found Hierarchical cluster analysis to be superior in meeting that test. So, we did not consider it necessary to use the KMeans technique.

7.2 Theoretical Foundation for Determining Number of Clusters—And Their Meaning

As already stated, a major purpose of this paper is to identify the market share leader and determine the price-quality segment—based on unit price—it is competing in.

An important question in performing cluster analysis is determining the number of clusters based on an a priori theory. Most consumer markets can be divided in three basic price-quality segments: premium, mid-price, and economy. These three basic segments can be extended to five: with the addition of super-premium and ultra-economy segments (Datta, 1996).

Therefore, three represents the minimum and five the maximum number of clusters (Datta, 2012, 2017, 2018a, 2018b, 2018c, 2019a, 2019b).
An equally crucial issue is to figure out what each cluster (e.g., *economy, mid-price, and premium*) really means.

Perhaps a good way to understand what each price-quality segment stands for in real life is to look at a socio-economic *lifestyle* profile of America. It reveals *six* classes (Note 31). Each class is associated with a price-quality segment typified by the retail stores where they generally shop; each a symbol of their lifestyle (Datta, 2011).

### 7.3 Guidelines for Cluster Consistency and Reliability

In addition to laying a theoretical foundation for the *number* of clusters, we set up the following guidelines to enhance cluster consistency and reliability (Datta, 2012, 2017, 2018a, 2018b, 2018c, 2019a, 2019b):

- In general, there should be a *clean break* between contiguous clusters.
- The *anchor* clusters—the top and the bottom—should be *robust*. In a cluster-analysis project limited to a range of three to five clusters, a robust cluster is one whose membership remains constant from three- to four-, or four- to five-cluster solutions.
- Finally, we followed a step-by-step procedure to determine the optimal solution. First, we start with *three* clusters. Thus, the bottom cluster obviously becomes the *economy* segment and the top cluster the *premium* segment. Next, we go to *four* clusters, and tentatively call them: *economy, mid-price, premium,* and *super-premium*. Then we go to *five* clusters. If the membership of the *bottom* cluster remains unchanged from what it was in the four-cluster result, it clearly implies that the *ultra-economy* segment does *not* exist. Next, if the membership of the *top* cluster also remains the same from a four- to a five-cluster solution, then the *top* cluster becomes the *super-premium* segment. This means that even in a five-cluster solution we have only *four* price-quality segments: *economy, mid-price, premium,* and *super-premium*. It means that either the *premium* or the *mid-price* segment consists of two *sub-segments* (see Table 2).

#### 7.3.1 External Evidence to Validate Results of Cluster Analysis

Whenever possible, we have tried to seek *external evidence* to validate the results of cluster analysis. For example, many companies identify on their websites a certain brand(s) as a *premium* or luxury brand. A case in point is that of P&G which says that its plan is to compete in all “price points:” *super-premium, premium,* and *mid-price* except the *economy* segment (Datta, 2010b).

### 7.4 Testing Hypotheses

- I—That the market-share leader would be a member of the *mid-price* segment.
- II—That the market-share leader would carry a price tag that is *higher* than that of the nearest competition.

#### 7.5 Results of Cluster Analysis

In Table 2 we present the results of cluster analysis for Toothpaste for 2008 for the 5.8-6.5 oz pack that include 25 brands with sales >$10,000. Since many brands have offered *multiple* styles in this size (and others) we have chosen the *most* popular for each brand in this study. However, the sales data for each
brand represents total brand sales.

The results show five clusters, but only four price-quality segments, with the premium segment featuring two sub-segments.

Crest, the market leader has a market share of 34.7%, and is a member of the mid-price segment with a unit price of $2.99; a price somewhat higher than that of the runner-up Colgate—also a member of the mid-price segment—with a unit price of $2.86.

Other notable results are: Sensodyne as a member of the super-premium segment; Arm & Hammer and Tom’s of Maine as part of the premium segment, and Aquafresh as an occupier of the economy segment.

The results for 2007 were similar to those for 2008.

Thus, these results fully support both Hypothesis I and II: for 2008 as well as 2007.

Interestingly, these results are generally similar to those for Men’s Shaving Cream, U.S. Beer, U.S. Shampoo, U.S. Shredded/Grated Cheese, and U.S. Refrigerated Orange Juice markets.

7.6 Relative Price a Strategic Variable

Finally, we performed one more test to determine the consistency and reliability of the results of cluster analysis in this study. So, we ranked the unit price of each brand for 2008 and 2007.

All three measures of bivariate correlation—Pearson, and non-parametric measures Kendall’s tau_b, and Spearman’s rho—were found to be significant at an amazing 0.01 level!

We believe these surprising results—that cover such a large number of brands—became possible only because management in the U.S. Toothpaste market must have been treating relative price as a strategic variable, as we have suggested.

While the price of a brand, compared to its nearest competition, may change over time, it is unlikely to change much from one year to the next. This is significant not only for the market share leader, but also for every brand no matter which price-quality segment it is competing in.

Another conclusion one can draw from such impressive results is that the U.S. Toothpaste market is highly competitive.

These results are also in accord with seven earlier U.S. studies involving: Men’s Shaving Cream, Beer, Shampoo, Shredded/Grated Cheese, Refrigerated Orange Juice, Men’s Razor-Blades, and Women’s Razor-Blades (Datta, 2012, 2017, 2018a, 2018b, 2018c, 2019a, 2019b).

7.7 The Role of Promotion

For 2008 promotional sales of the Toothpaste market averaged 37.2% of retail sales. We performed bivariate correlation between total (net) retail sales vs. promotional (PROMO) sales. The results were significant for all three measures—Pearson, Kendall, and Spearman—at the 0.01 level.

Table 3 shows the promotional intensity of 14 brands with 2008 sales over $1 million. Colgate emerges as the lone brand in the Very Heavy category (47.9%), followed by two brands in the Heavy category: Crest (38.9%) and Aquafresh (38%).

It seems both Colgate and Crest have relied on high-level promotional intensity to promote and to
defend their dominating positions in the market. Since Aquafresh is competing in the economy segment on a low price, one could reasonably argue that it need not offer heavy discount as well. Nevertheless, the company must have felt that it has to do \textit{both} to protect its market share of 7.1%—by far the highest in the economy segment.

\textbf{8. Strategic Groups in the U.S. Toothpaste Market, 2008}

We found \textit{four} strategic groups in this market. Their market shares are as follows:

1. \textit{Market leader}: Procter & Gamble Co.
   - Crest: 34.7%

2. \textit{Runner-up}: Colgate Palmolive Co.
   - Colgate: 33.5%
   - Ultrabrite: 0.5%

3. \textit{Medium-size Players}
   - Glaxo-SmithKline
     - Aquafresh: 7.1%
     - Sensodyne: 6.8%
     - Church & Dwight
       - Arm & Hammer: 5.2%
       - Aim: 0.7%

4. \textit{Minor Players}
   - Tom’s of Maine: 1.7%
   - Unilever
     - Mentadent: 1.1%
     - Close-Up: 0.6%
     - Pepsodent: 0.4%

\textbf{8.1 Procter & Gamble Co. (P&G)}

P&G is one of the leading consumer product companies in the world. In 2018, it had sales of $67 Billion. Crest is part of the Health Care segment which accounted for 13\% of its sales (Note 32).

\textbf{8.2 Colgate Palmolive Co.}

Colgate Palmolive is a large consumer products co. In 2018 its word-wide sales were $15.5 Billion. Colgate toothpaste is part of the Oral Care Division.

In 2008 Consumer Reports found that Ultrabrite’s All-in-one \textit{whitening} toothpaste was “excellent at stain removal” (Note 33).

\textbf{8.3 Glaxo SmithKline and Aquafresh}

Glaxo SmithKline is a British multinational pharmaceutical company with $33 Billion in sales in 2018.
8.4 Church & Dwight
Church & Dwight, the owners of Arm & Hammer toothpaste, had sales of $4.1 Billion in 2018 (Note 34).
The company bought Aim brand in 2003 from Unilever which it introduced in 1973 (Note 35). Aim was riding high around 1996 when it had a market share of 7%: because its gel toothpaste had become quite popular then (Datta, 1996). However, Aim’s share dropped to a mere 0.7% in 2008 (Table 2). Interestingly, Aim did not offer a gel toothpaste in 2008.

8.5 Tom’s of Maine
Tom’s of Maine was founded in 1970 by Tom and Kate Chappell (Note 36). Tom’s is a leading manufacturer of toothpaste with natural ingredients. Its latest estimated sales are $76 million (Note 37).

8.6 Unilever
Unilever is a huge British-Dutch international company with sales of $73 Billion in 2017 (Note 38). We compared the 2008 market shares of Unilever’s current three toothpaste brands with their shares in 1996. We found that two of these suffered a precipitous decline in their market shares: Close-Up from 6% to 0.6%, and Pepsodent from 2% to 0.4% (Table 2; Datta, 1996).

Figure 1. Benefit Segmentation Profile of the U.S. Toothpaste Market, 2008

Table 1. Benefit Segmentation Profile of the U.S. Toothpaste Market: 2008 vs. 1996

| Benefit Segment                                      | 2008 | 1996 |
|------------------------------------------------------|------|------|
| Appearance (white teeth)                             | 60%  | 13%  |
| Aesthetics (baking soda, natural ingredients)        | 8%   | 7%   |
| Dental Health (regular, tartar, sensitivity)         | 29%  | 59%  |
| Taste, color, convenience (gel, kids, stripes)       | 3%   | 21%  |
| Total                                                | 100% | 100% |
Note 1. This analysis does *not* include the “Low Price”, or the *economy* benefit segment. This is because, in addition to offering the benefit of low price, these brands also rely on one or more of the other four benefits to target their customers.

Note 2. The 2008 data for the “Appearance” segment covers only regular general-purpose brands, but does *not* include whitening brands that are targeted at narrow segments, e.g., tartar, sensitivity, baking soda, natural ingredients, gel, kids, and stripes. So, if we look at *all* whitening brands the 60% figure in Table 1 jumps to 68%!

| PriceQualitySgmt | Brand Name with sales >$10,000 | SizeOz | UnitPr. | ClsCtr | MkSh% | BrandSales$M |
|------------------|--------------------------------|--------|---------|--------|-------|--------------|
| **Super-Premium**| SENSODYNE TOOTH CLEANER WHITENER | 6      | $7.50   | $7.43  | 6.8%  | $85.8        |
|                  | SMART MOUTH TOOTH CLEANER WHITENER | 6      | $7.36   | 0.0%   | $0.4  |              |
| **Premium I**    | DR. KEN’S TOOTH CLEANER WHITENER | 6      | $5.78   | $5.54  | 0.0%  | $0.1         |
|                  | VIADENT ADVANCED CARE TOOTH CLEANER | 7      | $5.30   |        |       | $1.0         |
| **Premium II**   | JASON POWER SMILE TOOTH CLEANER WHITENER | 6      | $4.88   | $4.58  | 0.1%  | $1.2         |
|                  | NATURE’S GATE TOOTH CLEANER WHITENER | 6      | $4.61   | 0.0%   | $0.4  |              |
|                  | NOW XYLI WHITE TOOTH CLEANER WHITENER | 6.4    | $4.57   | 0.0%   | $0.0  |              |
|                  | T.O.M. NATURAL CARE TOOTH CLEANER | 6      | $4.45   | 1.7%   | $21.0 |              |
|                  | A&H ADVANCE TOOTH CLEANER WHITENER | 6      | $4.38   | 5.2%   | $65.4 |              |
| **Mid-Price**    | MENTADENT TOOTH CLEANER WHITENER | 5.25   | $3.43   | $3.09  | 1.1%  | $13.7        |
|                  | CREST TOOTH CLEANER WHITENER | 6.2    | $2.99   |        | 34.7% | $440.3       |
|                  | DR. TICHENOR’S TOOTH CLEANER WHITENER | 6.4    | $2.99   | 0.0%   | $0.0  |              |
|                  | COLGATE /TOOTH CLEANER WHITENER | 6      | $2.86   |        | 33.5% | $424.9       |
| **Economy**      | PRIVATE BRANDS TOOTH CLEANER WHITENER | 6.4    | $1.80   | $1.20  | 0.6%  | $8.1         |
|                  | CLOSE-UP TOOTH CLEANER WHITENER | 6      | $1.69   | 0.6%   | $8.2  |              |
|                  | AQUAFRESH T-P TOOTH CLEANER WHITENER | 6.4    | $1.62   | 7.1%   | $90.4 |              |
|                  | GLEEM TOOTH CLEANER WHITENER | 6.4    | $1.27   | 0.0%   | $0.5  |              |
|                  | ULTRA BRITE ALL IN ONE TOOTH CLEANER | 6      | $1.25   | 0.5%   | $7.0  |              |
|                  | PEPSODENT TOOTH CLEANER WHITENER | 6      | $1.02   | 0.4%   | $5.6  |              |
|                  | AIM TOOTH CLEANER WHITENER | 6      | $1.00   | 0.7%   | $9.1  |              |
|                  | UNITED EXCHANGE CORP-NBL TOOTH CLEANER | 6.4    | $1.00   | 0.0%   | $0.0  |              |
|                  | KAREWAY TOOTH CLEANER WHITENER | 6.4    | $1.00   | 0.0%   | $0.0  |              |
|                  | PERSONAL CARE TOOTH CLEANER WHITENER | 6.4    | $1.00   | 0.0%   | $0.1  |              |
|                  | CHOICE TOOTH CLEANER WHITENER | 6.4    | $1.00   | 0.0%   | $0.1  |              |
|                  | LAVORIS NATURALS TOOTH CLEANER WHITENER | 6.5    | $0.68   | 0.0%   | $0.1  |              |
| **Total (25 cases)** | | | | | | **$2.40** |
| **Grand Total All Toothpaste Brands** | | | | | | 100.0% | **$1,269.0** |
Notes.
1. All brands included here are those with the most popular pack size: 5.8-6.5 oz.
2. Two exceptions are: Viadent 7 oz, Mentadent 5.3 oz.
3. Sales data shows total brand sales for 2008.
4. Unit price data is based on the most popular style for each brand for the 5.8-6.5 oz pack.

| Brand Names                         | PromIntnsty | PQSegment | Sales$M | MkSh% | %Prom2008 |
|------------------------------------|-------------|-----------|---------|-------|-----------|
| Brand Total All TOOTH PASTES       |             |           | 1269.0  | 100.0%| 37.2%     |
| COLGATE TOOTH CLEANER              | Very Heavy  | Mid-price | 424.9   | 33.5% | 47.9%     |
| CREST TOOTH CLEANER                | Heavy       | Mid-price | 440.3   | 34.7% | 38.9%     |
| AQUAFRESH                          | Economy     | Economy   | 90.4    | 7.1%  | 38.0%     |
| PEPSODENT TOOTH CLEANER            | Moderate    | Economy   | 5.6     | 0.4%  | 31.7%     |
| AIM TOOTH CLEANER                  | Economy     | Economy   | 9.1     | 0.7%  | 30.5%     |
| CLOSE-UP TOOTH CLEANER             | Economy     | Economy   | 8.2     | 0.6%  | 29.6%     |
| PRIVATE BRANDS TOOTH CLERANER      | Low-Moderate| Economy   | 8.1     | 0.6%  | 25.5%     |
| TOM’S OF MAINE NATURAL CARE/TOOTH CLEANER | Premium |             | 21.0    | 1.7%  | 24.4%     |
| SENSODYNE TOOTH CLEANER            | Super-premium | Economy | 85.8   | 6.8%  | 22.3%     |
| ARM & HAMMER TOOTH CLEANER         | Premium     | Economy   | 65.4    | 5.2%  | 19.5%     |
| ULTRA BRITE TOOTH CLEANER          | Light       | Economy   | 7.0     | 0.5%  | 16.8%     |
| JASON TOOTH CLEANER                | Premium     |           | 1.2     | 0.1%  | 15.7%     |
| MENTADENT TOOTH CLEANER            | Mid-price   |           | 13.7    | 1.1%  | 15.3%     |
| VIADENT                            | Premium     |           | 1.0     | 0.1%  | 10.3%     |

9. Conclusion
This study is based on the idea that in most consumer markets, a business in quest of market-share leadership should try to serve the middle class by competing in the mid-price segment; and offering quality superior to that of competition: at a somewhat higher price to connote an image of quality, and to ensure that the strategy is both profitable and sustainable in the long run. The middle class is the socio-economic segment that represents about 40% of households in America.

Quality, however, is a complex concept that consumers generally find difficult to understand. So, they often employ relative price and a brand’s reputation as a symbol of quality.

In 1896 Colgate introduced a toothpaste in a collapsible tube similar to contemporary toothpaste tubes. This packaging innovation by Colgate turned out to be critical in encouraging mass production and consumption of toothpaste because consumers found toothpaste in a collapsible tube so easy to use.
Remarkably, most Americans did not brush their teeth until after WWII. When the Army soldiers returned home after the war, they brought with them the habit of regular brushing: a practice the Army had made compulsory.

No wonder dental cavities had become a big health problem in America at that time. Pollan suggests that four of our leading chronic diseases—coronary heart disease, diabetes, stroke and cancer—can be traced directly to industrialization of our food, which he calls the Western diet. Among the key factors contributing to these diseases are the rise of highly processed foods, refined grains, and the superabundance of cheap calories of sugar and fat produced by modern agriculture.

Another side effect of the Western diet was that dental cavities became a serious health problem in America. However, studies of native populations in several countries not exposed to the Western diet, revealed a different picture: they had little or no tooth decay.

P&G began a joint research project with the University of Indiana to test the role of fluoride in toothpaste. The clinical results were so heartening that P&G launched Crest with Fluoristan nationally in 1956. In 1960 Crest became the first brand of toothpaste to earn an endorsement from the American Dental Association. In 1976, the American Chemical Society recognized Crest with fluoride as one of the 100 greatest discoveries of the previous 100 years.

In 1997 Colgate introduced Total toothpaste, and quickly it became the market leader. In 2018 Colgate launched the next generation of Colgate Total toothpaste which contains a new stannous fluoride formula that fights plaque-causing bacteria in the mouth.

In 1996 America had just two minor whitening brands. However, in 2008 the floodgates had opened, and all brands except two, offered whitening toothpastes that accounted for a stunning 68% of total retail sales.

This study is based on U.S. retail sales for 2008 and 2007. The U.S. retail Toothpaste Market sales for 2008 were $1.27 Billion with two major competitors: Crest with a market share of 34.7%, and Colgate with 33.5%.

Employing Hierarchical Cluster Analysis, we have focused on the 5.8-6.5 oz pack which was by far the most popular with a 45.3% share.

We tested two hypotheses: (1) That the market-share leader would be a member of the mid-price segment, and (2)

That the market leader would carry a price tag that is higher than that of the nearest competition.

The results fully supported Hypothesis I and II: both for 2008 and 2007. We ranked the unit price of each brand for 2008 and 2007. All three measures of bivariate correlation—Pearson, and non-parametric measures Kendall’s tau_b, and Spearman’s rho—were found to be significant at an amazing 0.01 level!

Thus, this result indicated that relative was a strategic variable in the U.S. Toothpaste market, as we have hypothesized. This result is also in accord with seven earlier studies.

In an analysis of benefit segments of the U.S. Toothpaste market in 2008 we found the following five:
1. Appearance (White teeth)
   i. Remove surface stains
   ii. Remove deep/embedded stains
2. Aesthetics
   a. Clean, fresh feeling
   b. Natural ingredients
3. Dental Health
   a. De-sensitizing teeth
   b. Anti-cavities
   c. Anti-plaque
   d. Anti-gingivitis
   e. Anti-tartar
4. Taste, color, convenience
   a. Gels, colors, stripes, unusual flavors
   b. Pumps and special containers
5. Low price (brands in the economy segment)

In a comparison of benefit segmentation between 2008 and 1996, the most striking result was that whitening toothpastes accounted for 68% of total retail sales in 2008 vs. a mere 2% in 1996. Yet, in addition to white teeth, these toothpastes also continued to be helpful in preventing dental decay, as before.

Finally, we discovered four strategic groups:

1. Crest: Market leader
2. Colgate: Runner-up
3. Medium-size players
   i. Glaxo-SmithKline
   ii. Church & Dwight
4. Minor players
   i. Tom’s of Maine
   ii. Unilever

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**Notes**

Note 1. Profit Impact of Market Strategies.
Note 2. https://www.colgate.com/en-us/oral-health/basics/brushing-and-flossing/history-of-toothbrushes-and-toothpastes
Note 3. https://www.en.wikipedia.org/wiki/Teeth_cleaning_twig
Note 4. *Miswak* is also popular as a chewing stick, especially among Muslims (see Note 3).
Note 5. https://www.en.wikipedia.org/wiki/Toothbrush
Note 6. https://www.colgatepalmolive.com/en-us/about/history
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Note 21. https://www.top5reviewed.com/mentadent-toothpaste/
Note 22. https://www.investor.colgatepalmolive.com/news-releases/news-release-details/colgatermakes-its-best-toothpaste-even-better-new-whitening
Note 23. https://www.investor.colgatepalmolive.com/news-releases/news-release-details/introducingnew-colgate-simply-whiter-whitening-toothpaste
Note 24. https://www.prnewswire.com/news-releases/colgate-launches-optic-white-advanced-ledwhitening-300946668.html
Note 25. https://www.colgate.com/en-us/products/toothpaste/ow-renewal
Note 26. https://www.news.pg.com/blog/birth-icon-crest
Note 27. https://www.news.pg.com/press-release/pg-corporate-announcements/introducing-new-crest3d-white-glamorous-white-toothpaste-a
Note 28. https://www.tomsofmaine.com/our-promise/ingredients/sodium-lauryl-sulfate
Note 29. This data is from food stores with sales of over $2 million, and drug stores over $1 million; it also includes discount stores, such as Target and K-Mart, but excludes Wal-Mart as well as warehouse clubs, e.g., Sam’s Club, Costco, and BJ’s. It also does not include the “dollar” stores, such as Dollar General, and others.
Note 30. For those stores for which, during a week, there were feature ads, coupon ads, display, or temporary price decrease of at least 5%.
Note 31. The six classes are: “The Poor”, “The Near Poor”, “Traditional Middle Class”, “The Upper-Middle Class”, “The Very Rich/The Rich”, and “The Mega Rich—Masters of the Universe”.
Note 32. https://www.pg.com/annualreport2018/index.html#/Financial-Highlights
Note 33. http://www.chathamjournal.com/weekly/living/health/cr-tests-whitening-toothpastes-60706.shtml
Note 34. http://www.investor.churchdwight.com/news-releases/news-release-details/church-dwightreports-q4-and-fy2018-results
Note 35. https://www.wiki2.org/en/Aim_(toothpaste)
Note 36. https://www.referenceforbusiness.com/history2/93/Tom-s-of-Maine-Inc.html
Note 37. https://www.owler.com/company/tomsofmaine
Note 38. https://www.unilever.com/investor-relations/unilever-shares/about-shares/unilever-shares-the-basics/