



Flavor Innovations in GLOBAL SNACK FOODS

Through greater use of flavor science and technology, PepsiCo delivers locally relevant and authentic flavors in winning products from Mumbai to Moscow.

The advance of science in the food industry has been astonishing. The progress in analytical instrumentation alone is staggering. Through use of gas chromatography/mass spectrometry, high-pressure liquid chromatography, and scanning electron microscopy with elemental identification, we now have the ability to separate, identify, and measure many compounds in foods. These sophisticated and sensitive tools help to monitor and control our products.

The product developer has an expansive toolbox of flavors, enhancers, encapsulation options, emulsifiers, grains, oils, etc. to choose from to create successful new products that meet consumer preferences. Likewise, the ways to prepare the final products have also expanded with roasting, toasting,

infrared heating, microwaving, vacuum frying, and much more.

And yet, there is undeniably a lot of art to making food products taste good. We still rely on chefs to create well-balanced flavors. Even untrained consumers can detect a rancid potato chip faster than any infrared spectrometer. In fact, all they have to do is smell the just-opened bag.

Our ability to connect ever-advancing food science to affordable, better-tasting, and healthier products is the only sustainable way to differentiate products and maintain a competitive advantage. In an environment of continued commoditization of food products and increasingly sophisticated private label manufacturers, we must continue to advance our science while staying close to our consumers.



At PepsiCo, We Love Foods

Why is connecting science to the world of food so important to PepsiCo? In a nutshell, it's because the food business is so important to our business and future growth. *Foods*, which includes *Snacks*, is a critical part of the total PepsiCo portfolio.

Our total “foods” story is not one that we often tell. Usually, we discuss our strong North American business, driven by Frito-Lay. Or, we cover the growth potential of emerging markets like China, Russia, Brazil and India.

To begin, our foods business is over 60% of PepsiCo's revenues. And, over the past three years, has grown slightly better than our overall beverage business. To be fair, a very large portion of the beverage revenues accrues to our bottling partners. So, on a total system level, beverage revenues are still larger than foods. But for the PepsiCo corporation, foods is our largest business.

Our global foods revenues—just over \$27 billion—make us a substantial player in the global

Using its MasterChef approach to identify locally relevant flavors and FlavorPlus technique to recreate those authentic flavors in a finished product, PepsiCo was able to launch a line of potato chips under the Lay's Chaat Street brand. Chaat (i.e., savory snacks made with fried dough, potatoes, spices, etc.) is a very common form of eating/snacking in India, often from small kiosks on the street.

food industry. For example, if you compare our revenues to those of our competitors' foods revenues, PepsiCo would be the 4th largest food player in the world. And clearly among the fastest growing.

The global market in which we compete is almost \$200 billion in retail sales. And, over time, has shown mid-to-high, single-digit growth. Certainly, as economies like China, India, and Brazil continue to improve, the outlook for food growth remains strong as 40% of the world's population lives in these countries. Further, the almost \$200 billion market in which we compete is just a part of the overall total food universe.

Most people think of PepsiCo's Foods business as a snack business, namely chips. While we are strong in the global snack chip segment, it is less than one-third of the total markets in which we compete. We have tremendous strengths in the snack chip segment with over a 40% share of the global segment and we have the opportunity to continue to increase per capita consumption in markets outside the United States. Also, we have the “go-to-market” expertise to make direct-store delivery (DSD) a competitive advantage in most markets in which we compete. »»»

Beyond snack chips, we see equally attractive categories. In fact, outside of our core salty snacks business sits another \$130 billion of business. Although we already compete in many of these segments, we will certainly need to uniquely add value in order to earn the right to grow.

Shifting our Flavor Strategy

Our processes and flavor technology often are replicated globally. However, for consumers, flavors are local. As recently as 1998 we had a flavor strategy that counted on big successful flavors, mostly from the U.S., that could be replicated throughout the world. This strategy worked well as we benefited from growth from universally accepted flavors such as *Sour Cream & Onion* and *Nacho Cheese*. We also had the “British Empire” flavors (i.e., *Salt & Vinegar* and *Cheese & Onion*) that worked well in countries like the U.K., Australia, and somewhat in Canada and Western Europe. Moreover, we had a well-developed flavor business in Mexico with flavors such as *Nacho Jalapeño* on *Doritos* and *Chile* and *Limon* on just about everything.

But we were running out of big flavors to apply globally. That led to a key insight that seems obvious in retrospect but wasn’t at the time—at least to us. That insight was very simply that to continue to grow our flavored snack business we had to have locally relevant flavors with an execution that lived up to the expectation.

As I said before, our initial hypothesis was that we could build our business by capturing flavor trends and executing them globally. For example, bringing Thai or Mexican flavors everywhere. We brought chefs and culinary experts from around the world to tell us the next big flavor trends. That’s when the epiphany happened. Every chef we brought in told us that what we really needed to do was capture local traditional flavors that in some cases were being diminished by the explosion of globalization.

Identifying locally relevant flavors that could add incremental business was an important step, but only the beginning. The promise to consumers of a locally relevant flavor would raise expectations on delivery. We needed to do a much better job of delivering on the authenticity of the flavors so they would be believable. That led to an all-out effort to improve our technical capability to deliver authentic flavors.

To meet our new flavor strategy, we developed two key techniques—the “MasterChef” process to identify locally relevant flavors and “FlavorPlus” technology to recreate authentic local flavors in the finished products.

Using the MasterChef process, we were able to design a methodology that we could roll out worldwide to replicate

PepsiCo’s first successful application of its MasterChef and FlavorPlus techniques was in Mexico for its Sabritas Limón lime-flavored potato chips. Despite already being a well-established flavor in the company’s Mexican business, the new lime flavor significantly increased sales.



successful development of locally relevant flavors. PepsiCo maintains an extensive network of chefs and culinary experts from around the world that we can leverage to discern flavor preferences and trends. We work with our functional partners from Marketing and Purchasing

as well as our key flavor suppliers in local ideation sessions. We created a toolbox that describes not only how to identify potential winning flavors, but also how to conduct quantitative testing in a uniform and reliable way to get to a product-launch flavor.

To deliver the authenticity of a flavor, we understood that replicating the timing of how a flavor is released during consumption (e.g., aroma, taste, texture, etc.) is critical to making an authentic flavor that lives up to consumers expectations.

Our first successful application was in Mexico on our lime-flavored potato chips. Anyone who has spent at least a day in Mexico can see how prominently a role lime plays in flavoring. Fresh-squeezed key limes are ubiquitous flavor accompaniments to a wide range of dishes and foods, including snacks. Not surprisingly, we already had a reasonably successful lime-flavored potato chip on the market. However, with the insight that our current lime flavor did not really replicate real fresh-squeezed lime, we went to work. First, we had to capture the aroma of a fresh-squeezed lime peel note, which is a consumer’s first sensory experience well before eating or chewing. Then, we would bring in the fresh citrus flavor, followed by the fried potato flavor from the chip, and ending with a fresh citrus note leading to the next bite.

The results were very positive. Despite already being a well-established flavor in our Mexican business, the new lime flavor significantly increased sales.

Replicating Success Worldwide

Once we developed the methodology for identifying winning locally relevant flavors and added the technical capability to deliver more authentic flavors, our challenge was to take the process around the world. The only way to do that was to spend time in the individual markets with the local

R&D and Marketing teams. For example, we tried a lot of Chaat (i.e., savory snacks made with fried dough, potatoes, spices, etc.) in Mumbai and Delhi to identify the right flavors for a line in India called *Lay's Chaat Street*. Chaat is a very common form of eating/snacking in India, often from small kiosks on the street.

Building on our firsthand experience of sampling many forms and flavors of Chaat, we had a team of local PepsiCo managers—together with local chefs and partners from our key flavor houses—brainstorm possible Chaat versions for a line of potato chips. The next step was to put the ideas into concept testing to identify the most appealing, most incremental ideas. With a short list in hand, we turned to our flavor houses to develop flavors that would live up to the promise of a Chaat line. We leveraged our FlavorPlus technology and understanding of the timing of the key flavor notes to make authentic-tasting flavors for our potato chips.

Many people who grew up in Russia can relate to the experience of picking wild mushrooms with their family in the fall. In fact, this is a powerful emotional memory for many



PepsiCo used the powerful emotional memory of Russian families picking mushrooms in the fall to help create a line of mushroom-flavored potato chips.

adults. A common preparation is to cook the mushrooms in sour cream. We identified this flavor in a MasterChef session with our Russian colleagues. In concept testing, we could see we had a hit. Next, the challenge was to produce a believable flavor. Mushroom is a difficult flavor to capture. With a lot of help from one of our flavor houses, we were able to “nail” the aroma and flavor of cooked wild mushrooms. The resulting potato chip product was an instant success in Russia and almost entirely incremental to business—there just wasn’t anything like it on the market. And, because of the difficulty in making an authentic mushroom flavor, it won’t be easy to copy.

Making Healthier Products

PepsiCo is committed to “Performance with Purpose.” PepsiCo’s responsibility is to continuously improve all aspects of the world in which we operate—products, environment, people—to create a better tomorrow for future generations. Clearly, our products can play an important role. We play a responsible role in health & wellness by offering a range of product choices and encouraging healthy lifestyles through activity.

Over the past decade, we have seen a clear and steady trend of health & wellness concerns, some of which have the potential to be a barrier to consumption of our products. We have been very active reformulating our products to reduce or eliminate ingredients of concern and at the same time adding positives like whole grains and new product choices like low-fat baked potato chips and bread snacks.

Frito-Lay has a tradition of being at the forefront of healthy snacking. We introduced reduced-fat *Ruffles* in the late 1980s, *SunChips* with multigrains in the early 1990s, low-fat *Baked Lay's* in 1995, and no-fat *Lay's* made with *Olean* fat-free oil in 1998—just to name a few.

In 2002, the scientific community came to a consensus on the negatives of *trans* fats (they were originally thought of as a healthier alternative to saturated fats). By the end of 2003, Frito-Lay eliminated *trans* fats from all their snack products, becoming the first major snack manufacturer to eliminate *trans* fats.

In the U.S., we use oils like sunflower and corn that are very low in saturated fats. While we have some room for improvement elsewhere in the world, we’re making progress with a goal to be in healthier oils throughout our global businesses.

Further, we have been active in lowering sodium. Our products are already much lower in sodium than most people realize. For example, a serving of *Lay's* has a fraction of the sodium of most soups. Nevertheless, we have been investing substantial R&D to look for novel ways to further reduce the sodium in our products.

Finally, we have introduced many new products to deliver positive nutrition. For example, in 2007, we launched *Flat Earth* snack crisps with a half serving of vegetables or fruit in every ounce. We introduced the *True North* line of natural nuts and nut crisps in 2008. We have the low-fat *Stacy's* line of pita chips in North America. In Australia, we have a low-fat line of rice crackers under the *Sakata* brand. Last year, we launched *Baked Lays* in several countries, including Europe and South America. We rolled out *Cheetos* with added protein in India ... and the list goes on and will grow even faster in the future. Of course, we have the world’s leading brand of oats under our *Quaker* brand. We’re expanding *Quaker* across the globe with recent launches in China and India.

Importantly, we’re also reducing the use of artificial colors and flavors to deliver simpler ingredient statements.

Moving Ahead with Open Innovation

In order to deliver against our Health & Wellness agenda and to continue to provide better-



Frito-Lay has a tradition of being at the forefront of healthy snacking with its product portfolio of reduced-fat Ruffles, SunChips made with whole grains, Baked Lay's potato crisps, and Flat Earth crisps with a half serving of vegetables or fruit in every ounce.

tasting, more-authentic products, we continue to develop new technologies and capabilities. When it comes to our core competencies like frying or potato agriculture, we believe we have the world's experts and significant amounts of proprietary knowledge. As we move into new categories and look for new tools to make our products healthier and tastier and keep them affordable, we have to look beyond our own internal capabilities.

While we may have not been one of the first CPG companies to adopt open innovation, we believe we have leveraged it aggressively in recent years. More importantly, we

have integrated it into our R&D teams. In just the past four years, we have engaged in research contracts with several dozen external research partners from around the world, including universities, suppliers, entrepreneurs, and consultants. We have made these external research partners part of our development teams and gained a lot of experience in managing multiple work streams with multiple partners. Furthermore, we have learned the importance of motivating our product development partners to share in the excitement of launching new products. When you have young post doctorates working on projects, money is just part of

the way to motivate them. We make sure they understand our vision of being a company that makes and sells delicious, healthy, and affordable snacks. When they get excited about the vision, we see immediate dividends in the creativity and output from our hybrid internal/external research teams.

What's next?

Fortunately, we still have a lot of opportunity to further improve the taste, authenticity, health, and naturalness of our products. There are also a lot of snack and food categories that we don't currently have a large stake in. So, there is a lot of upside for us both in the U.S. and especially internationally.

In order to continue to make our products delicious and expand them into new categories, we're investing in our culinary capabilities. We hired an executive chef in 2008 and are looking forward to the inauguration of a state-of-the-art culinary innovation center in Plano, Texas, later this year.

Under the leadership of our recently appointed Chief Scientific Officer Dr. Mehmood Khan, we are making significant investments into long-term research and creating capability in the Biological Sciences well beyond what we have had historically. We created a new department to focus on long-term process and packaging technology to create highly capable and flexible manufacturing lines and environmentally sustainable, consumer-preferred packaging materials and package designs.

With our local capability, external research partners, increasing focus on long-term research, and investment in culinary capability, we believe we have the right "recipe for innovation" for PepsiCo's Global Foods business. **FT**

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