

Trends in Sweeteners – An Industry Perspective (or Do you really know your customer?)

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thought leadership in health



Disclosures (alphabetical)

Current contracts (within past 12 months)

- Bill & Melinda Gates Foundation
- Bunge
- Care4ward, LLC
- Hudson Institute
- Indigo Ag
- Janji, LLC
- Nutrition Impact, LLC
- Pilot Lite Ventures
- Tufts University
- Weight Watchers

Past contracts

- American Egg Board
- American Pulse Association
- Dawn Foods
- Good Food Institute
- Pulse Canada
- Q:Quest, LLC
- Sterling Rice Group

Current boards / councils

- Cornell Division of Nutrition Sciences Advisory Council
- Pulse Science Research Cluster Scientific Advisory Board, Canada
- Tufts Nutrition Council
- Tufts School of Nutrition Policy Advisory Group

Past employers

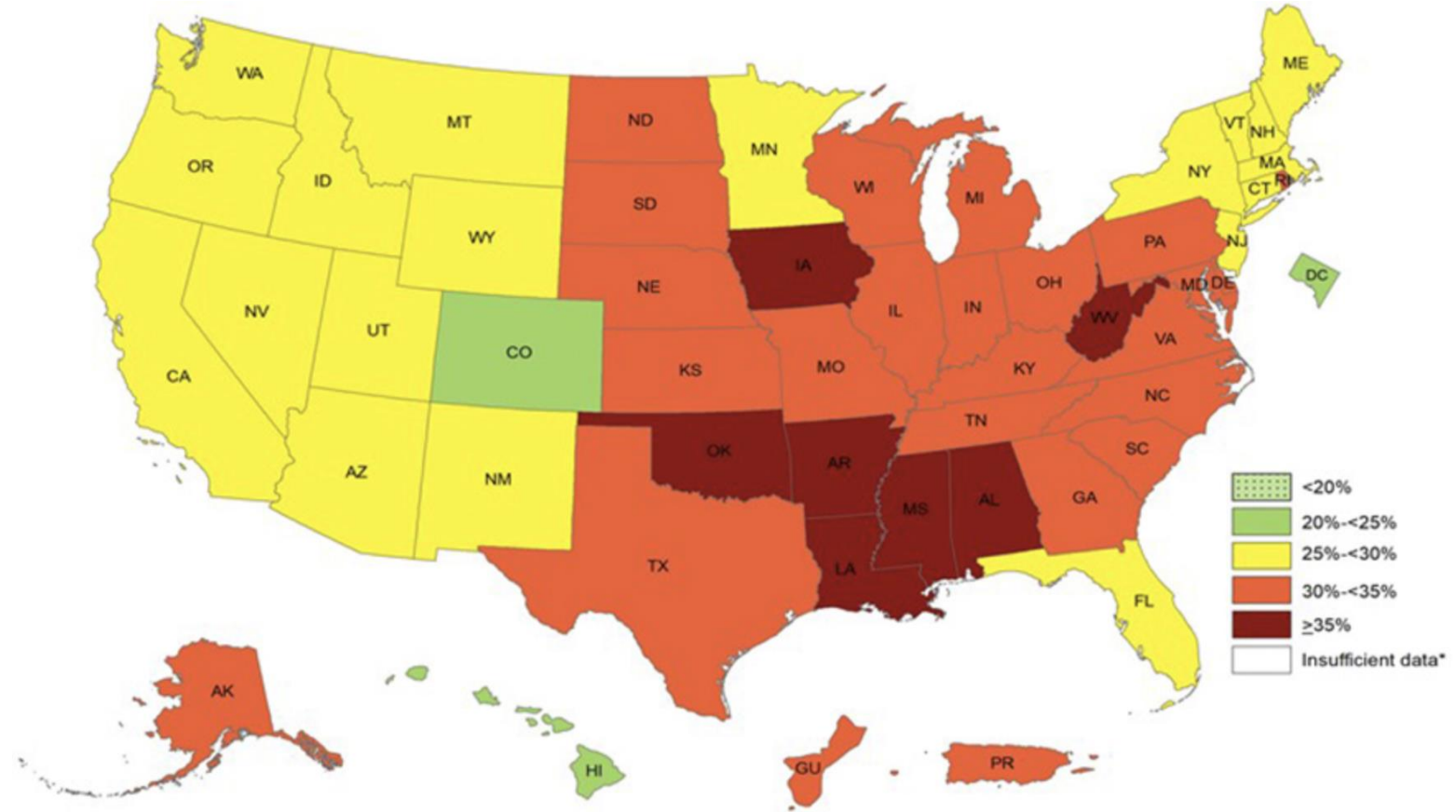
- University of Toronto
- Kellogg Co.
- Nestlé Canada
- Novartis, SA
- ILSI North America
- Kraft / Mondelez
- PepsiCo



- What is the context?
- Technical grounding
- Implementation
- Looking ahead



What is the context?



U.S. Obesity Rates Are Continuing to Climb

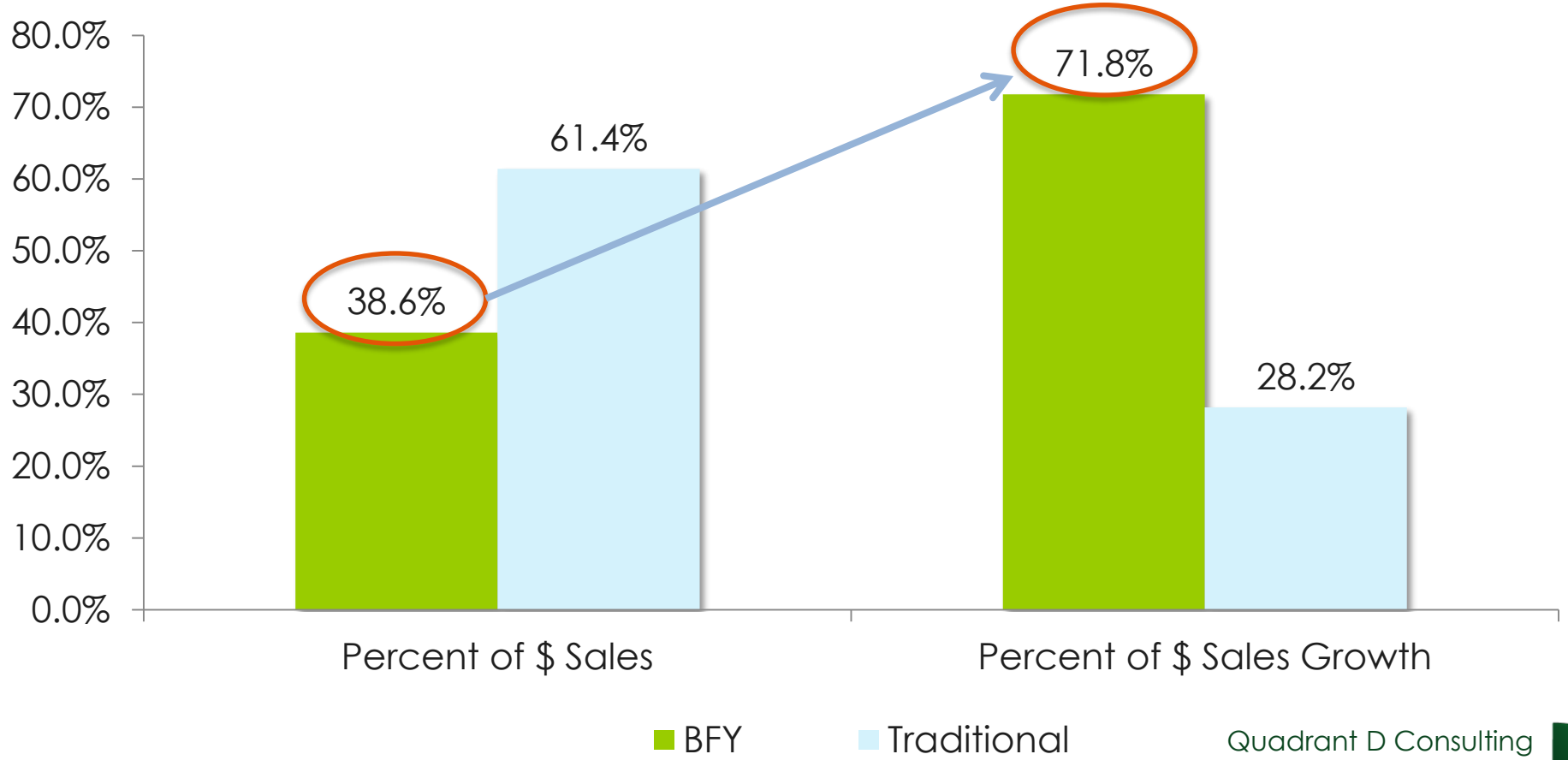
Source: CDC, 2017

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What is the context?

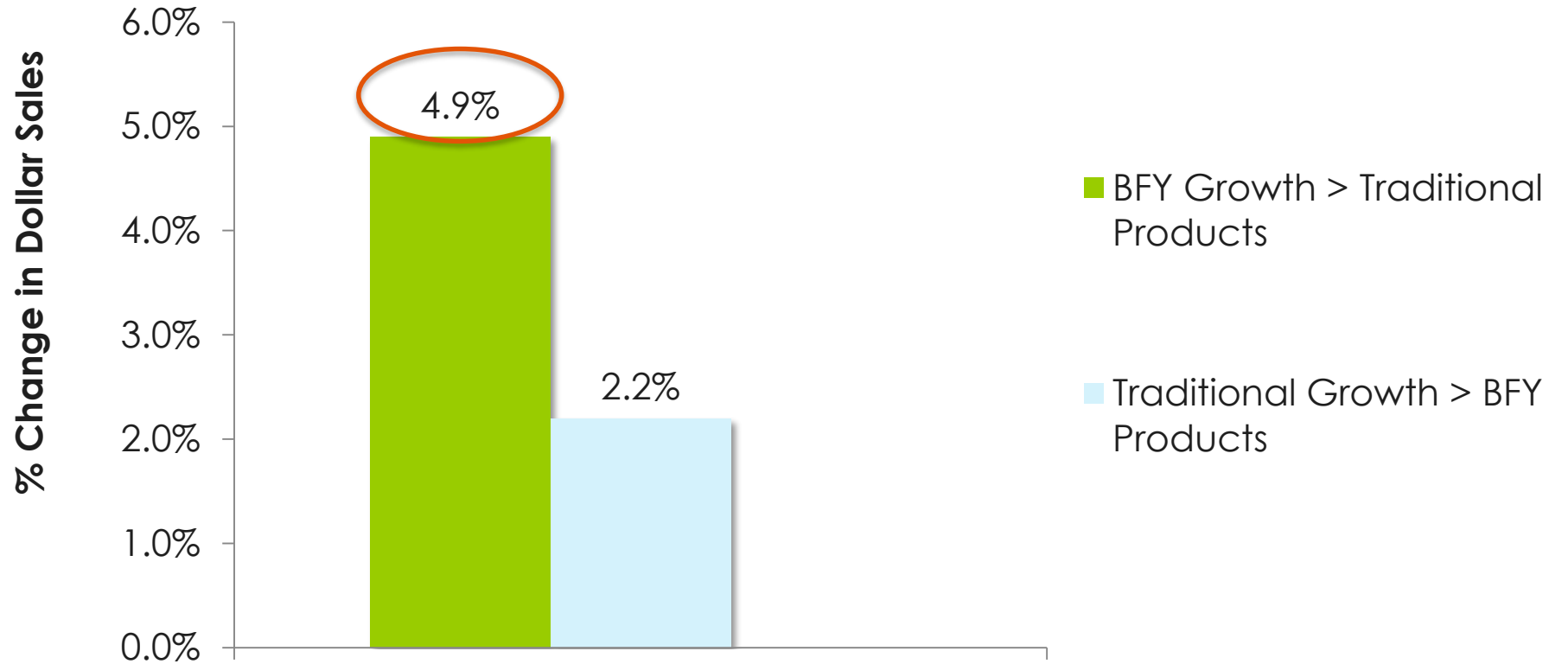
BFY items drove a disproportionate share of 5-year sales growth



Source: Nielsen Food, Drug and Mass Merchandiser sales tracking (2007-2011)

What is the context?

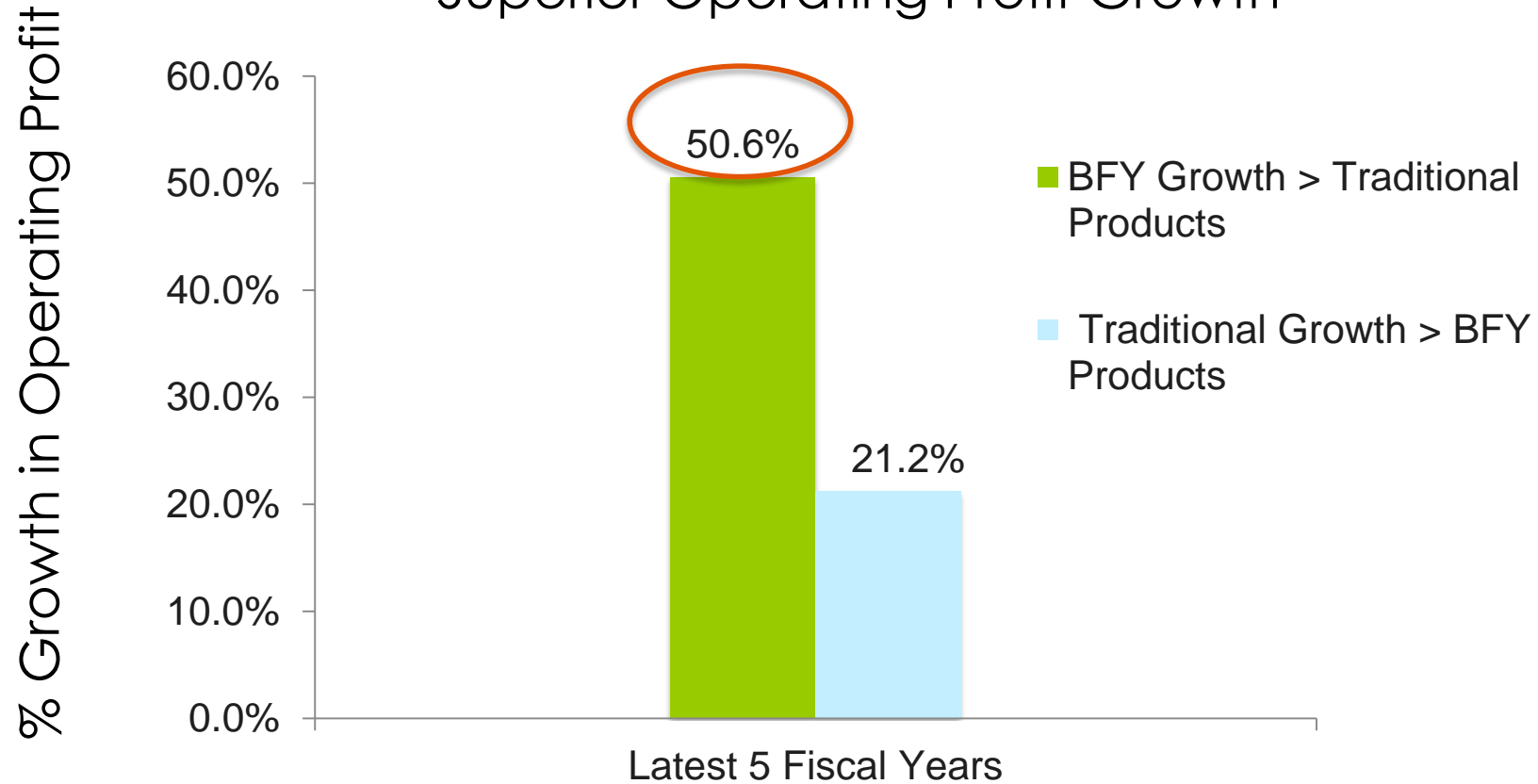
Companies Successful with BFY Products Exhibited Greater Overall Sales gains



Source: Nielsen Food, Drug and Mass Merchandiser sales tracking (2007-2011)

What is the context?

These Same Companies Demonstrated Superior Operating Profit Growth



Source: Nielsen Data & Company Annual Reports (2007-2011)



This is the context

natural

Less processed, known provenance, environmentally positive, fewer ingredients, gluten free, vegan, etc.

healthier

People have finally come to realize that food is the most important thing about health that they control

sensory

Taste is always at the top of the charts, but consumers look for new experiences with their food

functionality

It all counts for naught if we can't make it work as an ingredient

convenience

"On the Go" is more relevant than ever – but it extends into the home now too



Technical Grounding

“Added sugars” are either added during the processing of foods, or are packaged as such: free, mono- and disaccharides, sugars from syrups and honey, and sugars from concentrated juices in excess of reconstituted 100 % juice of the same type (concentrated 100 % fruit juice that is sold to consumers is excluded), also some sugars found in fruit and vegetable juices, jellies, jams, preserves, and fruit spreads.

Fructose

Sucrose (table sugar) = glucose + fructose

Galactose

Lactose (milk sugar) = glucose + galactose

Glucose

Maltose (malt sugar) = glucose + glucose



Common Sweeteners: Caloric

per Harvard T.H. Chan
School of Public Health

† FDA has determined that this term is misleading and cannot be used on food labels.

*Fully reconstituted fruit juice is not considered an added sugar

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Common Sweeteners: Caloric

Agave nectar

Brown sugar

Cane crystals

Cane sugar

Corn sweetener

Corn syrup

Crystalline fructose

Dextrose

Evaporated cane juice[†]

Fructose

Fruit juice concentrates*

Glucose

High-fructose corn syrup

Honey

Invert sugar

Maltose

Malt syrup

Maple syrup

Molasses

Raw sugar

Sucrose

Syrup

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Common Sweeteners: Low-calorie or Non-caloric

Low-calorie

Typically sugar alcohols, ~ 0.5 to 0.9x sweetness and ~7% to 100% of the energy per gram of sucrose.

- Erythritol
- Isomalt
- Lactitol
- Maltitol
- Mannitol
- Sorbitol
- Xylitol

Sugar alcohols that are equicaloric with sucrose can be used when trying to reduce the amount of added sugar or reduce the glycemic index of a product.

Non-caloric

Also called: high intensity sweeteners, artificial sweeteners, zero calorie sweeteners

- Saccharin
- Aspartame
- Acesulfame potassium (Ace-K)
- Sucralose
- Neotame
- Advantame
- Steviol glycosides (“natural”)
- Luo Han Guo fruit extracts (“natural”)



Flavors that can Enhance Sweetness - FMPs

- Flavors (flavorings) with modifying properties (FMPs) modify or enhance a flavoring and the food/beverage to which it is added.
- FMPs do not have or impart a specific characteristic flavor of their own. Rather, these compounds modify the flavor profile of a food or beverage by increasing attributes such as intensity of specific flavor characteristics (for example, umami, saltiness or sweetness) or reducing specific flavor characteristics (if something is perceived as being too fruity, for instance, or bitter or sour).
- The FEMA Sensory Data Task Force stipulates that FMP cannot have any inherent sweetness or saltiness on its own, or under conditions of intended use (meaning, in the finished product). Sweet and salty are chosen following the CODEX guidance. Specifically, the compound must be equivalent or less sweet or salty than a concentration of 1.5% sucrose or 0.25% for sodium chloride solution in a water base, respectively.



Implementation: Choosing the Right Sweetener

- Sugars are used for browning (Maillard reaction), bulking, cohesion, *etc.* - non-caloric sweeteners will not deliver on these attributes.
- Sugar alcohols are used in chewing gum and hard candies, where the cooling effects enhance the flavor/taste experience, and the calories that sugar alcohols may add are inconsequential (even sugar-sweetened gum has fewer calories than Crystal Light®).
- Acid stability is essential in beverage applications – aspartame disassociates over time in acid, leading to sweetness loss from the moment of production to moment of consumption. Ace-K, sucralose and saccharin are acid stable. (Soda fountains historically relied on saccharin as the sweetener in zero calorie beverages, as aspartame did not deliver a sufficiently consistent beverage from the soda concentrate – and consumer expectations for fountain beverages are different than those for RTD).
- FMPs allow for the reduction of sugar content, but FMPs that increase the intensity of the sweet flavor in a product may also increase the intensity of other flavors in a food or beverage.



Implementation – What are we trying to do?

- “New Coke” beat Pepsi by 6% to 8%, and was preferred over Classic Coke 55% to 45%, in blind taste tests.
- For Coke consumers, they preferred New Coke 53% to 47% in blind taste tests, and in unblinded tests, New Coke was preferred 69% to 31%.
- Reports state that the Coca-Cola Co. spent over \$4,000,000 (in 1984 – 85) to test acceptance of the new formulation, interviewing (with taste tests) over 200,000 consumers.
- Initial sales results were positive, even better than expected. Then the news stories started to appear about those who preferred the original recipe, and of protests organized against New Coke.
- By June, less than two months after launch, only 30% of people said they preferred New Coke. People wouldn’t accept changing Coke: “It was like saying you are going to make the flag prettier.”



Implementation – What are we trying to do?



aspartame



All

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About 10,500,000 results (0.46 seconds)

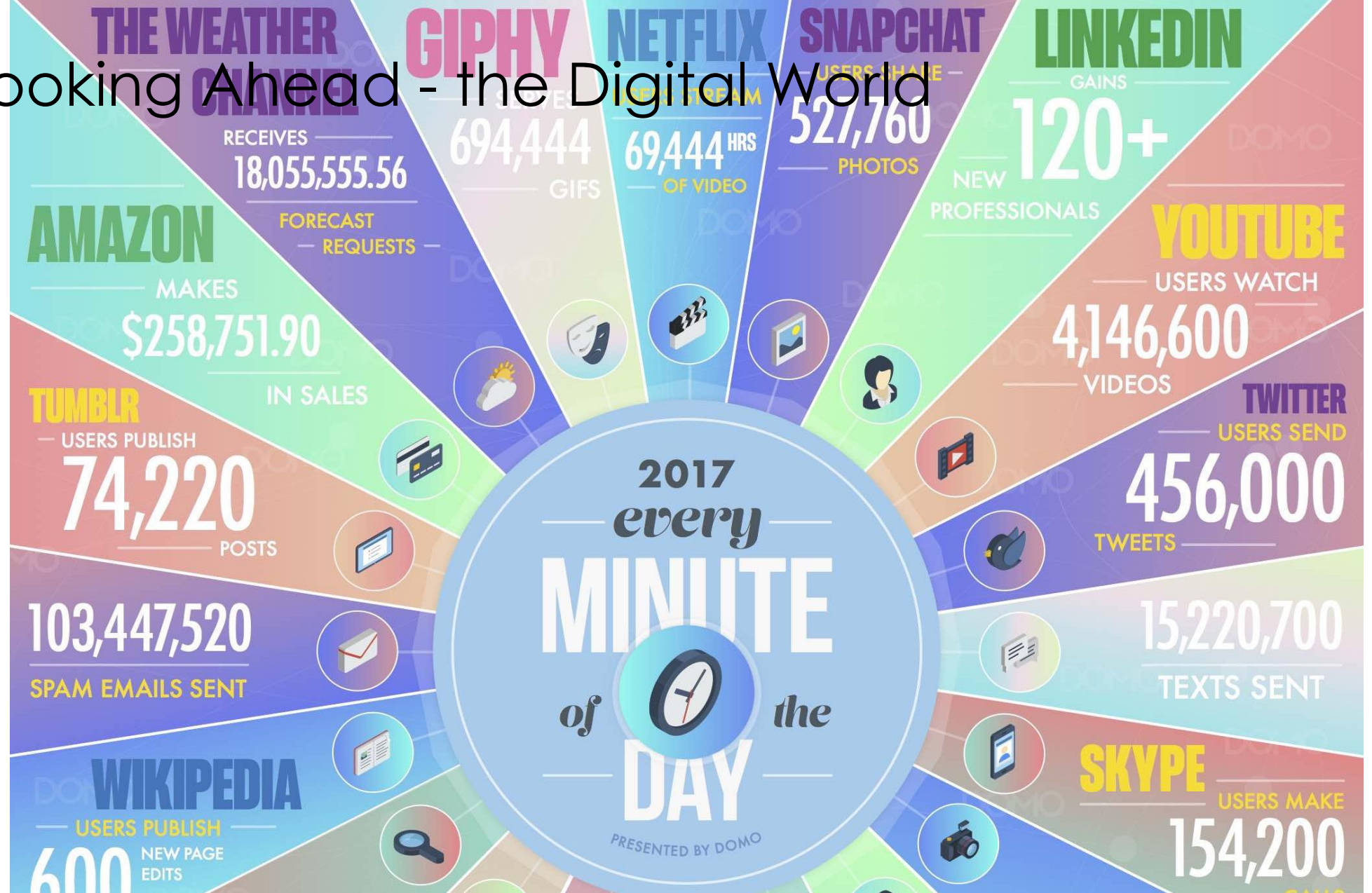


Implementation – Diet Pepsi and Aspartame

- In the USA, PepsiCo has used aspartame as the sweetener of choice in Diet Pepsi for more than 30 years. As such, there is a unique flavor and taste experience that the consumer knows and expects when drinking the product.
- In 2015, PepsiCo decided to remove aspartame from Diet Pepsi, in a marketing move driven by consumer perceptions regarding aspartame's safety, and replace it with sucralose and Ace-K, much to the chagrin of the Canadian market, where Diet Pepsi was the #1 diet cola at retail.
- The new Diet Pepsi had undergone rigorous consumer testing, stability testing, and was preferred to the original version.
- The outcome – shortly after launch the company faced a consumer backlash about its decision to drop aspartame from Diet Pepsi.
- Remember Coke Classic?
- So in 2016, PepsiCo resurrected the aspartame version—only in limited quantities, and marketed it as "classic sweetener blend."
- Now Diet Pepsi is once again sweetened with aspartame.
- How does this consumer reaction spread so quickly?



Looking Ahead - the Digital World



Looking Ahead - the Digital World

- How fast is all of this changing?
- 14 years ago Skype, Facebook, YouTube, Twitter, Tumblr, Dropbox, and Instagram didn't exist.
- 24 years ago there were only 130 websites total, Google wasn't even around yet, and you had to pay for an email account through an ISP (go watch the movie "You've Got Mail"); Today there are about 250 new websites added every minute.
- 27 years ago there was no internet (World Wide Web Project launched Aug 1, 1991)



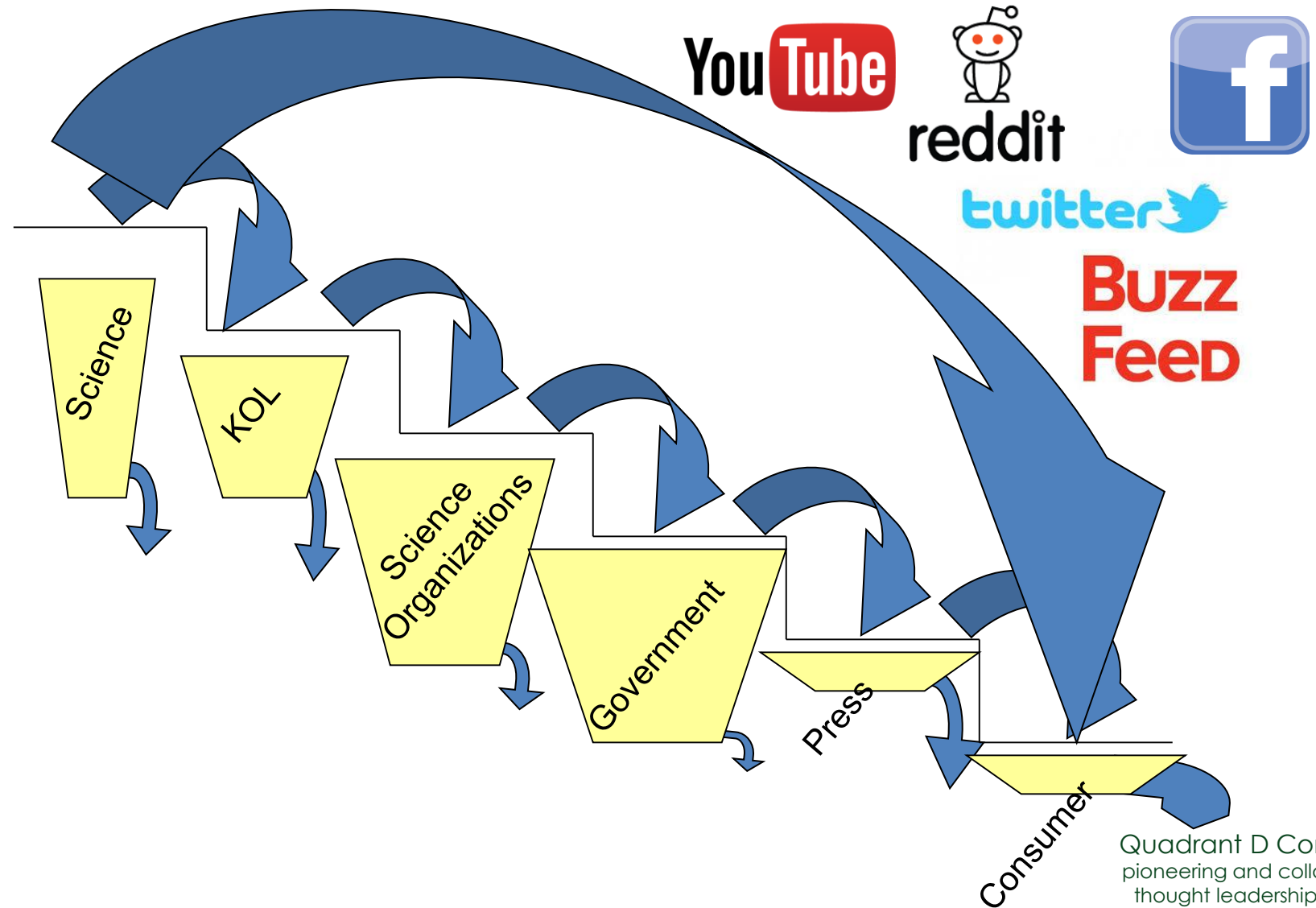
What happens when you ignore the digital world?

- A recent survey from the Oklahoma State University Department of Agricultural Economics found that 80.44% of respondents supported a government policy mandating labels on foods containing DNA.
- **Not GMOs, but DNA**, the genetic material contained in every living thing known to science and practically every food, GMO or otherwise
- ~82% support mandatory labels on GMOs

WARNING: This product contains deoxyribonucleic acid (DNA). The World Health Organization has determined that DNA is linked to a variety of diseases in both animals and humans. In some configurations, it is a risk factor for cancer and heart disease. Pregnant women are at very high risk of passing on DNA to their children. DNA can be transmitted in body fluids.



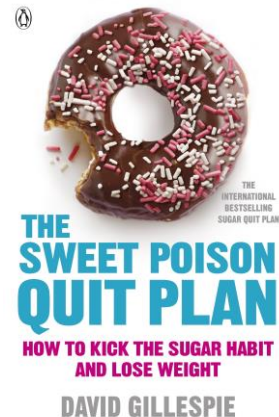
The Context Today: The Information Waterfall



The Context Today



The Plan to Reverse Your Sugar Addiction (in 14 Days!)



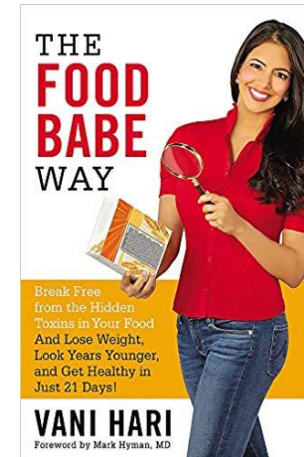
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5 Ways Sugar May Be Wreaking Havoc on Your Mind and Body

Here's how its ripple effect can make you irritable, cause digestion to go haywire, harm your liver—and leave you wanting more.

By Jessica Migala



Refined Sugar

10 Reasons You Need A Sugar Detox Right Now

By Food Babe

26



One of the most insidious ways the food industry poisons us is by dousing all sorts of foods with "added sugar." By "added sugar," I'm talking about any sweetener that doesn't occur naturally in a food. It may seem innocent, but what added sugar does to the body is scandalous. Added sugar is one of ... [Read More](#) →



Context – Find solutions to my problems

natural

Less processed, known
provenance,
environmentally positive,
fewer ingredients, gluten
free, vegan, etc.

healthier

People have finally come
to realize that food is the
most important thing
about health that they
control

Don't think of sugar as just
another commodity – making
it all about price means the
only leverage you have is,
well, price.

sensory

Taste is always at the
top of the charts, but
consumers look for
new experiences with
their food

Solve your customer's
problems and you will solve
your own as well.

“On the Go” is more
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but it extends into
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functionality

It all counts for
naught if we can't
make it work as an
ingredient



Thank you

