“Necessary but not sufficient”

“How is that working for you”

“No hill for a stepper”

“Let’s just act like our jobs depend on getting this right”

“I’m from Missouri, the Show Me State, so show me the data”

“Our goal is to eliminate art and make it science”

“Back off man, I’m a scientist”
Performance with Purpose – The Promise of PepsiCo
“Performance with Purpose is at the foundation of every aspect of our business. We integrate a commitment to human, environmental and talent sustainability into all of our operations.”

– Indra K. Nooyi
Good Business Is Good for All

Performance with Purpose
The Promise of PepsiCo

... is not a stand-alone initiative. Our sustainability goals across the four planks are woven into the fabric of our brands, and strengthened by our partnerships and the Power of One.
Delivering Performance with Purpose

Environmental Sustainability
Be responsible stewards of our planet’s resources

Talent Sustainability
Involving & empowering people to realize their potential, renew themselves and achieve success

Human Sustainability
Nourish consumers with a range of products
Encouraging People to Live Healthier

Human Sustainability
World Nutrition Challenge

OVER Nutrition

UNDER Nutrition


% of population
undernourished
0-24%
20-34%
5-19%
2.5-4%
<2.5%
no data

© PA
Human Sustainability Commitments

Reduce the average amount of:
- Sodium per serving by 25%
- Saturated fat per serving by 15%
- Sded sugar per serving by 25%

Increase the amount of whole grains, fruits, vegetables, nuts, seeds and low-fat dairy in our global product portfolio.
New York City Ban on Beverages > 16 oz

Sept 13: NYC Board of Health approved Mayor Bloomberg’s ban on sugared drinks > 16 oz

... cutting sugared beverage consumption the keystone of his anti-obesity strategy and his legacy
Increasing global F&V servings at least one per day...

More than a noble cause, it is a worldwide health imperative!

(Percent of Mortality)

<table>
<thead>
<tr>
<th>Condition</th>
<th>Mortality Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tobacco use</td>
<td>17.9</td>
</tr>
<tr>
<td>High blood pressure</td>
<td>16.8</td>
</tr>
<tr>
<td>Overweight and obesity</td>
<td>8.4</td>
</tr>
<tr>
<td>Physical inactivity</td>
<td>7.7</td>
</tr>
<tr>
<td>High blood glucose</td>
<td>7</td>
</tr>
<tr>
<td>High cholesterol</td>
<td>5.8</td>
</tr>
<tr>
<td>Low fruit and vegetable...</td>
<td>2.5</td>
</tr>
<tr>
<td>Urban outdoor air pollution</td>
<td>2.5</td>
</tr>
<tr>
<td>Alcohol use</td>
<td>1.6</td>
</tr>
<tr>
<td>Occupational risks</td>
<td>1.1</td>
</tr>
</tbody>
</table>

3.8% global mortality attributable to low intake of F&V

2.7 million lives could be saved each year with 600 g/day F&V

* Recommended daily intake = 400g fresh weight equivalent
Diverse Portfolio

Fun-for-You Portfolio

Better-for-You Portfolio

Good-for-You Portfolio
22 PepsiCo Billion-Dollar Mega Brands

**FUN-for-You**
- Pepsi
- Lays
- Fritos
- Mountain Dew
- Mist
- 7UP
- Brisk
- Walkers
- Doritos
- Ruffles
- Tostitos
- Miranda
- Cheddar's
- Starbucks

**Better-for-You**
- Pepsi Max
- Lipton
- Diet Pepsi
- Mtn Dew
- Gatorade
- Quaker

**GOOD-for-You**
- Tropicana
- Aquafina
“Jonathan, I don’t need more colors and flavors of Mountain Dew and Gatorade, I need a transformation of the beverage portfolio and we need a different scientific approach”
Traditional Approaches

- Product development led
- Tastes good

- Product and package development led
- Looks good
Sensory and Consumer Science

**SENSORY**

Perception of Beverage

- Difference Testing
- d /analysis, Traditional R-index, MultiMatch™
- Targeted Descriptive Analysis, Descriptive Analysis

**CONSUMER**

Fulfillment of Expectations, Purchase Intent, Liking

CLT, HUT, CPD
Focus Groups, Live Labs
Sensory and Consumer Scientists

- **Guide PD** and Marketing partners to create consumer-desired products
  - **Help** them understand product perception from consumer POV
  - **Provide** research design expertise, statistically link sensory and consumer results, and provide interpretation of data

- **Influence** to integrate concept and prototype development into a holistic process
  - Increase success rate
  - Speed development
Sensory Map of Prototypes

PC 1 = 52%
PC 2 = 21%

Weak Flavor

Strong Flavor

Sugar-Like Sweetness

Artificial Sweetness

Sugar-like sweetness vs. artificial sweetness

Leafy Green
Cherry
Vanilla
Dried Fruit
Fresh Lime
Candy Lime
Fresh Lemon
Cinnamon
Clove
Caramel
Brown Sugar
Molasses
Candy Lemon
Dried Fruit
Astringency
Bitter Sweet
Bitter
Bitter Linger
Sweet Linger
Sweet Aftertaste
Drying Sensation

PC 1 = 52%
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Optimization Guidance based on Consumer Segments

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Cluster 1
- Sugary
- Sugary
- Cherry
- Vanilla
- Dried Fruit
- Fresh Lime
- Candy Lime
- Cinnamon
- Clove
- Caramel
- Dried Fruit
- Leafy Green

Cluster 2
- Fresh Lemon
- 910
- Citrus aftertaste
- 450
- Artificial Sweetness
- PC 1 = 52%

Optimization Guidance based on Consumer Segments

PC 2 = 21%

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The Results
The New Approach: Technology
<table>
<thead>
<tr>
<th>Minimize Negatives</th>
<th>Natural Solutions</th>
<th>Whole Foods Nutrition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sugar</td>
<td>Preservatives</td>
<td>Fruits + Vegetables</td>
</tr>
<tr>
<td>Fat</td>
<td>Sweeteners</td>
<td>Whole Grains/Fiber</td>
</tr>
<tr>
<td>Sodium</td>
<td>Colors</td>
<td>Dairy</td>
</tr>
<tr>
<td>Bitterness</td>
<td>Processing</td>
<td>Protein</td>
</tr>
<tr>
<td>Artificial Ingredients</td>
<td></td>
<td></td>
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**TECHNOLOGY UNLOCKS:**

- Zero/Reduced Calorie Sweeteners
- Fat Replacers
- Advanced Salt Reduction
- GNC Fat Level Processing
- Bulk Sugar Replacer

- Natural “Zero Calorie” Sweeteners
- Natural Colors & Preservatives
- Natural Flavor & Maskers
- Processing, e.g. Aseptic & High Pressure
- Advanced Delivery Systems

- Advanced Agro Research
- Nutrient Retention
- Prolonged Fresh
- Multi-texture
- Package Barriers
• C class G Protein Coupled Receptor
• 8,000 reported sweet compounds
• Several blockers
• Cola’s ~ 0.3 M sugar
• Located in
  – Taste buds
  – Gut
  – Brain
  – Pancreas
From Extracts to New Taste Breakthroughs

NEW high-THROUGHPUT screening

NEW high-CONTENT screening

Screening robot identifies extracts that trigger critical taste receptors (sweet, salt, fat, bitter)
Linking Capabilities with R&D Product Development Experts

Product Development Team

Analytical
Chemistry

IT/
Informatics

Statistics/
Data Modeling

Comprehensive Chemical Profiling
GOAL: Improve yields of Stevia through natural, selective breeding

Existing Line 1 + Existing Line 2 = New Line

CHALLENGE: Which lines should be selected for breeding?

Genes + Metabolites → Biochemical Pathway Knowledge Map → Desired Phenotype
The Result!
Evolving the Approach with New Knowledge

Flat Earth

1 PD in the LEAD
Evolving the Approach with New Knowledge

Earth Center of Solar System

Moon  Earth  Venus  Sun  Mars

PD & Package in the LEAD
Evolving the Approach with New Knowledge

Earth Revolves Around The Sun

Technology in the LEAD
Evolving the Approach with New Knowledge

Galaxies & Expanding Universe

All sciences integrated to Understand HOW CONSUMER CHOOSES
People taste a beverage after being told “treat” or “healthy”. They then rate the pleasantness of the beverage and their brain images are recorded using fMRI.
BEHAVIORAL and Sensory Science?
RECEPTOR BIOLOGY and Sensory Science?
Over the past 5 years, genomewide association studies have yielded a wealth of insight into genes and chromosomal loci that contribute to susceptibility to disease.
...the study of heritable changes in gene expression or cellular phenotype caused by mechanisms other than changes in the underlying DNA sequence
A NEW Definition of Sensory Science...
A NEW Definition of Sensory Science...