Consumer acceptability: positioning a product for maximum volume or maximum liking in a niche

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NRI expertise

Sensory and consumer testing in:
UK, Malawi, Ghana, Tanzania, Nigeria, and Zimbabwe
Many products & commodities
applications

- Consumer acceptability
- Product development
- Plant breeding
- Market orientation - reaching majority and niche consumers
- Important in helping development projects to reach the poor.

7/7/2003
Experimental approach

- Consumer liking
- Socio-economic

Segment consumers by liking

Test products

Sensory analysis
- Score for objective attributes

Analysis for differences between products

Improved understanding of market for product
Consumer testing

Consumer liking
Demographic
Socio-economic interview
Data analysis

Consumer results

- Cluster analysis
- ANOVA
- Internal perception mapping
Sensory profiling

Trained panellists test product under controlled conditions (random coding, lighting, temperature etc)

Trained panellists
Data analysis (cont)

Sensory results

• ANOVA
• Perception maps (principal component analysis)
Application: Liking of fufu in Nigeria

- Fermented cassava product traditionally sold as a wet paste but is highly perishable
- CPHP project developed a dried product with improved shelf life and easier to market.
- Little information on consumer liking
Fufu samples tested

- Traditional wet
- Modified wet - grated roots and used less water
- Dried traditional
- Dried modified
- Two commercial dried samples (Ava & Olu-Olu)

7/7/2003
Location of fufu consumer testing

- 300 consumers interviewed
- 100 each at Abeokuta, Ibadan and Lagos
Results: Consumer profiles

- **Gender** - 63% male, 37% female;
- **Age** - 49% 20 to 29 yrs, 27% 30 to 39 yrs, 17% 40 to 49 yrs;
- **Education** - 82% had secondary or above education;
- **Ethnic group** - Yoruba (86%), Igbo (8%) and Hausa (6%).
Consumer profiles (continued)

- Eating - 13 to 35% ate fufu every day
- Place of eating - 48% to 65% (home), 10% to 23% (street food), 5% to 20% (work).
- Method of purchase differed - Abeokuta (92% cooked), Lagos (52% cooked, 29% wet), Ibadan (71% flour, 13% wet).
Consumer liking analysis

- Gender - female (5.6) liking significantly less than males (6.0)
- Age - liking increased with age from 5.7 to 6.2
- Ethnic group, how often they ate fufu or they type they usually purchased had no effect on liking
A digression to illustrate perception maps (PCA)

PCA is a multivariate technique
• Very useful for summarising complex data
• Makes the data easier to understand
• Is a mathematical solution and does not require an underlying statistical model
Example using perception of Great Britons

<table>
<thead>
<tr>
<th>Great Briton</th>
<th>Legacy</th>
<th>Genius</th>
<th>Leadership</th>
<th>Bravery</th>
<th>Compassion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brunel (1)</td>
<td>7</td>
<td>8</td>
<td>6</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>Diana (2)</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Darwin (4)</td>
<td>8</td>
<td>7</td>
<td>4</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Shakespeare (5)</td>
<td>7</td>
<td>7</td>
<td>3</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Elizabeth I (6)</td>
<td>6</td>
<td>6</td>
<td>7</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>Newton (7)</td>
<td>8</td>
<td>8</td>
<td>3</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Nelson (8)</td>
<td>6</td>
<td>6</td>
<td>8</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>Cromwell (9)</td>
<td>6</td>
<td>5</td>
<td>7</td>
<td>7</td>
<td>4</td>
</tr>
</tbody>
</table>
Great Britons

• It is difficult to see trends just by looking at the numbers in the table
• Perhaps we can try plotting a line chart?
Great Britons

Viewer score

- Brunel (1)
- Diana (2)
- Darwin (4)
- Shakespeare (5)
- Elizabeth I (6)
- Newton (7)
- Nelson (8)
- Cromwell (9)

Legacy, Genius, Leadership, Bravery, Compassion
Great Britons

- The line chart is not much clear either.
- This is where PCA is useful.
PCA of perception of Great Britons

- We can see that the perception is three dimensional, i.e.,
- legacy/genius
- bravery/leadership
- compassion
Great Britons - PCA

- We can now include the Great Britons and see how they relate.
- Elizabeth I, Nelson and Cromwell are perceived as brave and as leaders
- Brunel, Newton and Darwin are seen as geniuses and will leave a legacy
- Diana is compassionate
- Shakespeare is not brave or a leader
And now, back to the main plot!
Sensory (expert) panel

PC1 (71%)

PC2 (16%)

Modified wet
Dried modified
Creamy appearance
Shininess
Soft
Ava
Traditional wet
Sour
Smooth appearance
Dirty white
Sticky
Raw cassava smell
Dried traditional
Olu
How experts perceive fufu

- Sensory terms is two dimensional
- Fufu samples differ
Segmentation of consumers

- Used cluster analysis to separate consumers into 4 segments who had similar liking
- The liking of the segments significantly differed
Segment means

- S3 (21%)
- S2 (31%)
- S4 (18%)
- S1 (29%)
Segmentation of consumer

- Segments are significantly different
- Have different likings
Individual consumer preferences

Numbers refer to consumer segment.
PCA of individual likings

- Each line represents an individual consumer.
- The number donates the segment that that consumer is categorised as.
Internal perception mapping

![Graph showing internal perception mapping with dimensions and percentages]

- Traditional wet Olu-Olu
- Modified wet Dried
- Traditional Dried modified
- S1 (29%)
- S2 (31%)
- S3 (21%)
- S4 (18%)

PC1 (69%) --> PC2 (25%) --

Sticky texture
Sour taste
Dirty white colour
Sweet smell
Creamy appearance
Smooth colour
Shininess
Soft texture
Differences between consumer segments

- **S1 (29%)** - male (68%), civil servant (49%), older (33), from Lagos (40%)
- **S2 (31%)** - male (74%), civil servant (49%), older (33), from Lagos (45%)
- **S3 (21%)** - female (69%), student (43%), younger (29), from Abeokuta (36%) and Ibadan (38%) and purchase in the flour form
- **S4 (18%)** - male (69%), civil servant (40%) and student (40%), older (33) and from Abeokuta (39%) and Lagos (42%) and purchase more in the cooked form

No difference with ethnic group, education, how often they ate fufu, or other food types purchased.
Summary

• Consumers liked the modified wet product but disliked the commercial
• The dried samples were also preferred
• Consumers were divided into four segments
• All segments liked the traditional wet product
• One niche group (21% and female) did not like the new dried product who were ones already consuming flour. Why?
Conclusions

• New approach is useful and uses the ‘voice of the consumer’. Is an advance on traditional sensory methods.
• New product can penetrate market but existing buyers (female) of flour may require more persuading
• Why do segments differ? Could follow up with focus group interviews
• Technique shows competitive position of selected products and strengths and weaknesses
• Help with development of new and improved products