Which characteristics make food innovations appealing to consumers?

A cross-cultural consumer segmentation study

Jos Bartels (PhD) and Marleen Onwezen (MSc)
Wageningen University and Research Centre
Agricultural Economics Research Institute
The Hague, The Netherlands

Bolzano, 6th November 2010
Innovations in the European Fruit Industry

1. Understand the determinants of adoption and dissemination of innovations by consumers
2. Understand consumer behaviour to new modified products
3. Identify opportunities for fruit innovations
Theoretical framework on consumer innovativeness for fruit

Consumer Characteristics

Global context
- Socio-demographics
  - Market mavenism
  - Intercultural differences

Domain context
- Domain specific innovativeness
- Social Representations of novel foods
- Food neophobia
- Food involvement

Marketing communication

Product characteristics

Consumer innovation adoption

Kraszewska & Bartels (2008)
Introduction into the study

• Consumption of fresh fruit products has positive effects on a person’s health (WHO, 2003).

• Lower risk for diseases, such as coronary heart diseases and specific types of cancer (Block et al. 1992; Gerster, 1991; Hertog et al., 1993; Negri et al., 1991).

• Despite governmental intervention strategies fruit consumption in EU countries does not meet the recommended level (Joffe & Robertson, 2001; Pomerleau et al., 2004).
Introduction into the study

• Recently, Trienekens et al. (2008) suggested that innovations in the fruit industry may be a useful tool for increasing fruit consumption.

• Failure rates of food innovations are still very high (Martinez & Briz, 2000; Van Trijp & Steenkamp, 2005).

• Consumer segmentation could be used to successfully develop and market innovations for homogeneous consumer groups across national borders (Bijmolt et al., 2004; Ter Hofstede et al., 1999).
Introduction into the study

• Food choice motives
  • Looks appealing, Healthy, Convenient, Price, Taste, Familiar, Natural, Locally Produced, Safety. (e.g. Bäckström et al., 2003; Honkanen and Frewer 2009; Steptoe et al., 1995)

• Consumers differ in the relative importance they attach to each of these motives.

• Targeting consumer segments with similar needs is proposed to increase acceptance of fruit innovations.
Context of the current study

• Consumer segmentation study based on food choice motives.

• The current study takes into account
  • General food choice motives and specific product evaluations.
  • Multiple product categories to validate the results of the consumer segmentation.
  • Cross-cultural validation in four EU countries.
Method

• Procedure
  • Self-administered questionnaires
    • Online panel studies in the Netherlands (n=251), Greece (n=246), Poland (n=250), and Spain (n=250).
    • Representative for countries on age, gender, income and education.

• Measurement instrument
  • Demographics.
  • Importance ranking of fruit choice motives.
  • Domain-specific innovativeness (DSI).
  • Perceived product evaluations for four fruit innovations.
  • Buying intention for four fruit innovations.

• Analysis
  • Cluster analysis using sequential logit modeling (Latent GOLD 4.5 Choice program, Vermunt and Magidson 2005).
Novel Fresh Fruits

- Genetically modified apple
- Cholesterol lowering peach
- Mini nectarines without stone
- Fruit vending machine
Results

• Descriptive statistics
  • The optimal solution was a four-cluster model, with country as a concomitant variable (CAIC = 22266; Entropy R2 = 0.64).
    • Segment 1: The average consumer (35.7%)
    • Segment 2: The natural conscious consumer (30.1%)
    • Segment 3: The heterogeneous consumer (22.3%)
    • Segment 4: The health oriented consumer (11.9%)

• Demographics
  • Only country revealed differences in identification of the four segments.

• Focus on segment 1, 2 and 4.
**Importance of fruit choice motives per consumer segment**

<table>
<thead>
<tr>
<th>Consumer segments</th>
<th>1 (n=356)</th>
<th>2 (n=300)</th>
<th>4 (n=119)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taste</td>
<td>2.2</td>
<td>Natural</td>
<td>Healthy</td>
</tr>
<tr>
<td>Healthy</td>
<td>3.88</td>
<td>Healthy</td>
<td>2.50</td>
</tr>
<tr>
<td>Price</td>
<td>3.48</td>
<td>Safe</td>
<td>3.16</td>
</tr>
<tr>
<td>Looks appealing</td>
<td>3.67</td>
<td>Taste</td>
<td>3.97</td>
</tr>
<tr>
<td>Convenient</td>
<td>4.09</td>
<td>Price</td>
<td>5.53</td>
</tr>
<tr>
<td>Safe</td>
<td>5.22</td>
<td>Locally produced</td>
<td>6.07</td>
</tr>
<tr>
<td>Natural</td>
<td>6.65</td>
<td>Looks appealing</td>
<td>6.91</td>
</tr>
<tr>
<td>Familiar</td>
<td>7.22</td>
<td>Convenient</td>
<td>6.97</td>
</tr>
<tr>
<td>Locally produced</td>
<td>8.16</td>
<td>Familiar</td>
<td>7.79</td>
</tr>
</tbody>
</table>

1) = Average consumer  
2) = Natural conscious consumer  
3) = Health oriented consumer
## DSI and buying intentions for consumer segments

<table>
<thead>
<tr>
<th>Consumer segments</th>
<th>Average consumer FF (^a) ((n=356))</th>
<th>Natural consumer FF (^n) ((n=300))</th>
<th>Healthy consumer FF (^\gamma) ((n=119))</th>
<th>(F(df1, df2))</th>
</tr>
</thead>
<tbody>
<tr>
<td>DSI FF</td>
<td>3.42(^{ny})</td>
<td>3.38(^{ay})</td>
<td>3.50(^{an})</td>
<td>(F(2, 774)=1.281)</td>
</tr>
<tr>
<td>Cholesterol Lowering Peach</td>
<td>3.46(^{ny})</td>
<td>3.48(^{ay})</td>
<td>3.46(^{an})</td>
<td>(F(2, 380)=.019)</td>
</tr>
<tr>
<td>GM apple</td>
<td>3.43(^{y})</td>
<td>2.95</td>
<td>3.52(^{a})</td>
<td>(F(2, 393)=8.515***)</td>
</tr>
<tr>
<td>Mini Nectarines</td>
<td>3.89(^{y})</td>
<td>3.50</td>
<td>3.92(^{a})</td>
<td>(F(2, 393)=6.552**)</td>
</tr>
<tr>
<td>Fruit Vending Machine</td>
<td>3.22(^{ny})</td>
<td>3.11(^{ay})</td>
<td>3.50(^{an})</td>
<td>(F(2, 380)=1.489)</td>
</tr>
</tbody>
</table>

\(^a\) Fresh Fruits

---

**FF= Fresh Fruits**
DSI and buying intentions for consumer segments

- To reveal differences *within* consumer segments in the buying intention of the four product innovations, we used paired-sample T-tests for within subject differences and unpaired-sample T-tests for between subject differences.

- The comparison of the buying intention of the four product innovations within the consumer segments revealed that
  - The *Mini Nectarines* produced the highest buying intention in all segments.
  - In consumer segments 1 the *Vending Machine Fruit* had the lowest buying intention of all four product innovations.
  - In segment 2, both the *Vending Machine Fruit* and the *GM Apple* produced the lowest buying intentions.
  - The consumers in consumer segment 4 had positive buying intentions towards all fruit innovations.
Conclusions

• Different consumer segments can be identified based on the degree to which consumers value different product characteristics in the case of food product innovations.

• Country improves the identification of segments.

• Some product characteristics are important for all consumer segments (health and taste)

• And some product characteristics are unimportant (familiar and locally produced) for all consumer segments.
Conclusions

• The convenience related product innovation was attractive for all consumers.

• The new purchase channel was the least attractive product innovation.

• Different marketing strategies seem to be effective for different consumer segments.
Limitations and future research

• Only fresh fruits.

• Buying intention instead of actual behaviour.

• Only four EU countries.

• More behavioural variables (e.g. media usage, channel choice or shopping behaviour).
Thank you for your attention!

Email: jos.bartels@wur.nl
## Backup sheet: product categories

<table>
<thead>
<tr>
<th>A. Fresh fruit innovations</th>
<th>B. Processed fruit innovation</th>
<th>C. Prepared fruit innovations</th>
</tr>
</thead>
<tbody>
<tr>
<td>ORGANIC, LOCALLY PRODUCED</td>
<td>ORGANIC / WELL-KNOWN BRAND / CONVENIENCE</td>
<td>PREPARED - different tastes to eliminate preferences</td>
</tr>
<tr>
<td>Fresh organic local apple</td>
<td>Organic fruit mousse produced by Nestle (apple-apricot, apple-blueberry)</td>
<td>Fresh cut salad (or fresh cut salad vending machine)</td>
</tr>
<tr>
<td>FUNCTIONAL-fresh fruit with increased health effect</td>
<td>FUNCTIONAL – processed fruit with increased health effect</td>
<td></td>
</tr>
<tr>
<td>Lowering cholesterol peach</td>
<td>Lowering cholesterol juice (Orange Minute Maid)</td>
<td></td>
</tr>
<tr>
<td>CONVENIENCE of consumption and snacking</td>
<td>FUNCTIONAL – processed fruit with increased health effect</td>
<td></td>
</tr>
<tr>
<td>Mini nectarines without stone</td>
<td>Dried black-currant infused with fructose and prebiotic</td>
<td></td>
</tr>
<tr>
<td>EXOTIC FRESH FRUIT</td>
<td>CONVENIENCE of consumption and snacking, radical innovation</td>
<td></td>
</tr>
<tr>
<td>Fresh pitaya</td>
<td>Nectarine baked dried chips</td>
<td></td>
</tr>
<tr>
<td>GENETICALLY MODIFIED, ENVIRONMENTALLY FRIENDLY FRESH FRUIT</td>
<td>EXOTIC</td>
<td></td>
</tr>
<tr>
<td>G.M. apple more resistant to fungi, so less chemical spraying can be used during the cultivation.</td>
<td>Pitaya juice</td>
<td></td>
</tr>
<tr>
<td>NEW PURCHASE CHANNEL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fresh fruit vending machine (selling peaches and apples)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Backup sheet: Segments and Countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Average consumer FF (n=356)</th>
<th>Natural consumer FF (n=300)</th>
<th>Healthy consumer FF (n=119)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Netherlands</td>
<td>46.3%</td>
<td>10.3%</td>
<td>36.1%</td>
<td>25.2%</td>
</tr>
<tr>
<td>Greece</td>
<td>5.1%</td>
<td>51.3%</td>
<td>3.4%</td>
<td>24.7%</td>
</tr>
<tr>
<td>Poland</td>
<td>33.4%</td>
<td>26.3%</td>
<td>0.0%</td>
<td>25.1%</td>
</tr>
<tr>
<td>Spain</td>
<td>15.2%</td>
<td>12.0%</td>
<td>60.5%</td>
<td>25.1%</td>
</tr>
</tbody>
</table>