EDIBLE INNOVATIONS
FOOD INNOVATION AND CONFLICTING PRIORITIES BETWEEN TECHNOLOGICAL PROGRESS AND CONSUMER REJECTION

A SUMMARY OF THE MOST IMPORTANT RESEARCH FINDINGS
With the "Edible Innovations" survey, "DIE LEBENSMITTELWIRTSCHAFT e. V." has asked consumers their opinion regarding the numerous technological innovations that find their way either knowingly or unknowingly onto their plates.

We wanted to know whether the population is concerned about innovations in the agriculture and food sector and more about their attitudes towards various innovations in particular. The Fraunhofer Food Chain Management Alliance was entrusted with the scientific implementation of the survey.

Based on the resulting data, not only companies and associations, but also scientific institutions can specifically understand how food-related innovations can be better accepted and thereby improve their communication with consumers. The agriculture and food sector has always had a great ability to innovate. It creates technological innovations that are used in everyday life and will also be needed in future, to preserve both national and international resources with the aim of guaranteeing a reliable supply of healthy foods.

For this survey we conducted 1006 interviews between 9 July and 16 July 2015. The interviews are representative for the entire resident population of Germany. Innovations were defined as "technological developments that result in new products, services or processes". This document presents the essential results of the survey.

You can download the complete presentation of the results of this survey along with the questionnaire at:


Best regards
Stephan Becker-Sonnenschein
Managing Director
"DIE LEBENSMITTELWIRTSCHAFT e. V."
In a qualitative preliminary study, between March and April 2015, 20 guided interviews were conducted with government authorities, companies, associations, initiatives and researchers. Below is a summary of the results, which form the basis for the representative survey:

- Technological innovation with respect to the entire process chain is the core competence of the agriculture and food sector.
- The major companies are specifically expected to take the lead in fields such as bio-economy or Industrial Internet.
- The differences between b2b innovations (e.g. economy) and b2c innovations (e.g. benefit) need to be understood.
- The interlinking with civil society is currently inadequate. Awareness for potential improvements needs to be underlined.
- A better assessment of the impact of innovations on consumers is called for, such as in the case of new sources of protein.
- On one hand, opposition and scepticism towards technology is part of consumer diversity and on the other hand also a plaything for social media users.
- In their own interest, certain NGOs specifically promote fear of technology, which is partly caused by poor communication. However, food manufacturers feel they are being placed under general suspicion.
- Structural barriers to communicating innovation, such as politics or laws, need to be addressed.
- Substantive criteria for improving communication need to be developed.
- The most important innovations of the last 50 years: Food conservation (drying technology, refrigeration), functional ingredients, barcodes, improvements in sustainability (resource efficiency and the processing of residual material).

In addition, two student focus groups from the University of Regensburg have provided detailed descriptions and explanations of their dealings with innovations in the food sector.

The 20 experts and 13 students were interviewed separately to find out what they consider the most important innovations in the food sector over the last 50 years:

**In the opinion of experts:**

- Food conservation
- Aseptic filling: A sterile product is packaged in a sterile container
- Drying technology
- High-pressure technology and treatment
- UHT and Extended Shelf Life (ESL) milk
- Fresh food logistics, pasteurisation, hygienic properties that contribute towards food safety
- Logistical possibilities for the constant availability of fruit and vegetables
- Cold chain (cooling, freezing) makes a big difference, particularly for convenience foods
- Deep freezing
- Continuous production of foods
- Packaging industry: The use of polymers, i.e. less glass and more plastics (deep drawing, sealing, moulding of packaging)
- Beverage cartons (improved food quality)
- New types of marketing guided by civil society, such as Community Supported Agriculture
- Health-promoting products and health claims (cholesterol-reducing margarine)
- Organic farming, as it has meanwhile become part of mainstream society
- Bio-convenience
- MSC seal
- Nanotechnology
- Fast food

**In the opinion of students:**

- Microwave
- Induction cooker
- Electric kettle
- Pressure cooker
- Bread-making machine
- Thermomix
- Coffee capsules
- Refrigerator
- Cold chain, deep frozen products in general
- CA storage
- Frozen foods sold in small portions
- Constant availability of foods
- Smartphone and laptop in the kitchen
- Barcoding
- Local food-sharing
- Online ordering
- Delivery service
- Organic food deliveries

Derived from the results of the preliminary study, the following representative consumer survey helped us find out:

- What the general attitude towards innovations is.
- What the attitude towards food innovations is.
- Which innovations consumers are aware of.
- How they perceive them.

In conclusion, the attitudes towards innovation show us that there are five basic types of consumer.
For consumers, the most interesting fields of innovation are not the automotive or IT sectors, but health and healthy nutrition.

Two out of three respondents (63%) are either strongly or very strongly interested in the field of health and healthy nutrition, followed by IT/telecommunications (53%) and medicine (43%).

The production and processing of foods is in fourth place (41%). Innovations in commerce follow (35%), alongside pharmaceutics and cars/car accessories. The least interesting aspect of innovation is in agriculture (25%).

**RESULTS DERIVED FROM THE REPRESENTATIVE SURVEY**

**GENERAL INTEREST IN INNOVATIONS**

<table>
<thead>
<tr>
<th>Field</th>
<th>Interest Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health and healthy nutrition</td>
<td>63%</td>
</tr>
<tr>
<td>IT and telecommunications (e.g. mobile communications, computers, etc.)</td>
<td>52%</td>
</tr>
<tr>
<td>Medicine (e.g. diagnosis)</td>
<td>43%</td>
</tr>
<tr>
<td>Food production and processing</td>
<td>41%</td>
</tr>
<tr>
<td>Commerce</td>
<td>35%</td>
</tr>
<tr>
<td>Pharmaceutics (e.g. medications)</td>
<td>34%</td>
</tr>
<tr>
<td>Cars and car accessories</td>
<td>35%</td>
</tr>
<tr>
<td>Agricultural production</td>
<td>25%</td>
</tr>
</tbody>
</table>
2. GENERAL ATTITUDES TOWARDS INNOVATION

Consumers do not generally oppose technological innovation. They simply want to understand the benefit of an innovation.

80% of consumers regard innovation as necessary and an equal number find it important to understand the benefit of an innovation. Only one quarter of consumers are afraid of not being able to keep up with the fast pace of innovation. Only 18% frequently have major problems handling new technical devices.

80% agree
Technological innovations are necessary for both business and society.

80% agree
It is important for me to understand the benefit of a technological innovation and development.

25% agree
The large number of technological innovations make me worried about becoming confused or not being able to keep up.

18% agree
I frequently have major problems handling new technical devices.

3. PUBLIC AWARENESS OF FOOD INNOVATIONS

Consumers frequently fail to perceive food innovations for what they are. When asked about specific innovations, individual consumers often assess them positively.

However, when consumers are openly asked about innovations, they often have trouble answering. 43% and 44% of participants respectively are unable to name either positive or negative food innovations and 22% and 23% respectively did not answer either of the questions.

10% consider natural or organic cultivation and/or an increased number of organic products as a positive innovation. 8% consider genetically modified cultivation to be a negative innovation.

The results also show: In the opinion of consumers, technological innovations (e.g. new machines and/or technologies for reducing workloads, genetic engineering, online shopping) and general food-related topics (free trade agreements, factory farming, price developments) are mixed with each other.

In closed questioning, however, a number of innovations that affect the entire food production chain have attained a high level of awareness among consumers in some cases, although awareness does not automatically mean a positive perception of the benefits.

80% agree
Technological innovations are necessary for both business and society.

80% agree
It is important for me to understand the benefit of a technological innovation and development.

25% agree
The large number of technological innovations make me worried about becoming confused or not being able to keep up.

18% agree
I frequently have major problems handling new technical devices.

40% agree
Electronic price tags

48% agree
Convenience

49% agree
Tailor-made food

54% agree
Field monitoring

70% agree
Aseptic filling

46% agree
High-pressure technology

48% agree
Intelligent shopping trolley

46% agree
In vitro meat

44% agree
Supermarket recipe advisor

48% agree
CA storage

60% agree
Precision farming

42% agree
Ultrasound technology

38% agree
ESL milk

34% agree
Imaging techniques

29% agree
RFID in supermarkets

27% agree
Industrial Internet

23% agree
Nutrigenomics

54% agree
New sources of protein

58% agree
Drying technology

57% agree
Convenience products

56% agree
Nanotechnology

56% agree
3D printers

16% agree
Online ordering and delivery services

42% agree
Electronic price tags

81% agree
Genetic engineering

82% agree
Cold chain

82% agree
Self-service check-outs

82% agree
Bar-code technology

82% agree
Accountability

88% agree
Biotechnology

87% agree
Automatic milking and safety systems

70% agree
Polymer packaging

70% agree
Freshness logistics

68% agree
Local food-sharing

67% agree
New sources of protein

67% agree
Food “to go”

66% agree
Drying technology

67% agree
Convenience products

56% agree
Nanotechnology

56% agree
3D printers

54% agree
New sources of protein

48% agree
Drying technology

53% agree
Nanotechnology

87% agree
Genetic engineering

82% agree
Cold chain

82% agree
Self-service check-outs

82% agree
Bar-code technology

82% agree
Accountability

88% agree
Biotechnology

87% agree
Automatic milking and safety systems

70% agree
Polymer packaging

70% agree
Freshness logistics

68% agree
Local food-sharing

67% agree
New sources of protein

67% agree
Food “to go”

66% agree
Drying technology

67% agree
Convenience products

56% agree
Nanotechnology

56% agree
3D printers

54% agree
New sources of protein

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Drying technology

53% agree
Nanotechnology

87% agree
Genetic engineering

82% agree
Cold chain

82% agree
Self-service check-outs

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Bar-code technology

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Accountability

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Biotechnology

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Polymer packaging

70% agree
Freshness logistics

68% agree
Local food-sharing

67% agree
New sources of protein

67% agree
Food “to go”

66% agree
Drying technology

67% agree
Convenience products

56% agree
Nanotechnology

56% agree
3D printers

54% agree
New sources of protein

48% agree
Drying technology

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Nanotechnology

87% agree
Genetic engineering

82% agree
Cold chain

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Self-service check-outs

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Bar-code technology

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New sources of protein

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Food “to go”

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Drying technology

67% agree
Convenience products

56% agree
Nanotechnology

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3D printers

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New sources of protein

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Convenience products

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Nanotechnology

56% agree
3D printers

54% agree
New sources of protein

48% agree

IMPORTANCE OF FOOD INNOVATIONS

Almost two thirds (64%) see innovation as necessary for supplying the world’s population with food. 60% see innovation as an economic opportunity, whereas 59% are very curious about future innovations. A good one third (34%) tend to be sceptical about food innovations. One fifth (21%) are opposed to technical food innovations for fear of damaging their health.

When asked about the future importance of innovation strategies for food manufacturing, 85% put the preservation of resources in first place, followed by environmentally compatible packaging, improvements in livestock farming and the safeguarding of sustainable food production.

COMMUNICATION OF INNOVATIONS

Consumers want to have more information and greater transparency regarding the way food innovations are communicated. They need the focus to be on the benefit of the innovation and want to be involved at an early stage. The majority do not see tradition and innovation as contradictions.

Three quarters of those surveyed (76%) are of the opinion that the food sector (farmers, manufacturers and retailers) should communicate innovations more transparently. 28% feel they are sufficiently informed about technical food innovations, 37% feel they are not sufficiently informed.

77% are interested in the greater benefits of innovative foods, 73% find that consumers should be more closely involved in this topic. 67% do not see a contradiction between innovative and traditional food manufacture.

77%
Before I buy an innovative food, I want to understand the greater benefit.

76%
Agricultural producers and other players should communicate innovations more transparently.

73%
Consumers should be more closely involved in technical innovations.

67%
Innovative and traditional food manufacturing do not contradict each other.
PERCEPTION OF INNOVATIONS — CHANNELS OF COMMUNICATION

The most important sources of information are still the conventional media, i.e. TV and print. Consumers also want to gain personal impressions at trade fairs, farms, or by visiting companies and research institutes. The scientific expertise of researchers and research institutes should be taken more into consideration.

More than half of consumers obtain their information about innovations from TV (53%). Daily newspapers (31%), online media (30%) and family/friends/acquaintances (27%) are important sources for a large majority. 17% of participants obtained their information from scientific sources.

One fifth of those surveyed were not aware of any information relating to food innovations in any of the media sources during the last 12 months. They would like to obtain more information via TV and print. Around every fifth participant would like to gain a personal impression by visits to companies, scientific establishments or farms (18–20%).

ATTITUDES TOWARDS NUTRITION

Quality and taste are usually more important to consumers than the composition of a particular food. Two thirds are of the opinion that they generally eat a healthy, balanced diet.

75% say they pay great attention to selecting high quality foods. 66% say that they manage to generally eating a healthy, balanced diet, and 60% pay close attention to the foods they buy in order to stay healthy.

Taste is the most important point for 80% of participants when buying food. Almost half (49%) say that the taste is more important for them than the composition of a food. 29% agree that the topic of healthy nutrition is given too much attention, whereas 45% reject this statement.

Perception of innovations
Where have you obtained information about food innovations during the last 12 months?

<table>
<thead>
<tr>
<th>Source</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>TV</td>
<td>53</td>
</tr>
<tr>
<td>(Daily) newspapers and/or magazines</td>
<td>31</td>
</tr>
<tr>
<td>Online media</td>
<td>30</td>
</tr>
<tr>
<td>Family/friends/acquaintances</td>
<td>27</td>
</tr>
<tr>
<td>Social networks</td>
<td>20</td>
</tr>
<tr>
<td>Environmental and/or animal protection orgs</td>
<td>18</td>
</tr>
<tr>
<td>Science</td>
<td>17</td>
</tr>
<tr>
<td>Radio</td>
<td>15</td>
</tr>
<tr>
<td>Independent testing institutes</td>
<td>10</td>
</tr>
<tr>
<td>Nutrition experts</td>
<td>8</td>
</tr>
<tr>
<td>Federal government</td>
<td>6</td>
</tr>
<tr>
<td>Other media</td>
<td>1</td>
</tr>
<tr>
<td>Not aware of any information on innovations</td>
<td>21</td>
</tr>
</tbody>
</table>

Desired channels of information
In which media would you personally like to see more information on food innovations?

<table>
<thead>
<tr>
<th>Channel</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>TV</td>
<td>63</td>
</tr>
<tr>
<td>Daily newspapers</td>
<td>40</td>
</tr>
<tr>
<td>Special internet websites</td>
<td>31</td>
</tr>
<tr>
<td>Radio</td>
<td>23</td>
</tr>
<tr>
<td>Consumer trade fairs</td>
<td>22</td>
</tr>
<tr>
<td>Open days at scientific establishments</td>
<td>20</td>
</tr>
<tr>
<td>Visits to farms</td>
<td>20</td>
</tr>
<tr>
<td>Visits to companies</td>
<td>18</td>
</tr>
<tr>
<td>Trade magazines</td>
<td>18</td>
</tr>
<tr>
<td>Personally by speaking to family, etc.</td>
<td>15</td>
</tr>
<tr>
<td>Open days at universities, etc.</td>
<td>15</td>
</tr>
<tr>
<td>Trade fairs</td>
<td>12</td>
</tr>
<tr>
<td>Contact in social networks</td>
<td>11</td>
</tr>
<tr>
<td>Other media</td>
<td>1</td>
</tr>
<tr>
<td>No information required</td>
<td>8</td>
</tr>
</tbody>
</table>

80% agree I usually eat what I like the taste of.
75% agree I pay great attention to selecting high quality foods.
66% agree I generally eat a balanced, healthy diet.
60% agree I pay close attention to the foods I buy in order to stay healthy.
49% agree Taste is usually more important to me than the composition of a particular food.
CONSUMERS AND INNOVATION — A TYPOLOGY

Our representative survey showed that there are five different consumer groups among the population of Germany when it comes to technological innovation. It describes for the first time the groups to which the topic of innovation can be more strongly and specifically communicated:

- **Interested, sceptical** consumers think food innovations are necessary and although they are interested in groundbreaking innovations, they are somewhat sceptical towards them. They consider themselves adequately informed about innovations, but dislike having to deal with new technical devices.

- **Interested, supportive** consumers are highly interested in innovations and are technophiles. They see the necessity of innovations and have a positive attitude towards future innovations. Their high level of general involvement is expressed in their wish to be even better informed about upcoming innovations.

- **Disinterested, indifferent** consumers are hardly interested in food innovations and do not find them important. They consider themselves sufficiently well informed and do not wish to be more closely involved. Accordingly, this consumer group notices a lot less information regarding innovations.

- **Participating, critical** consumers are highly interested in innovations in the field of health and food manufacturing. They see the necessity of innovations for commerce and society, but have a sceptical attitude towards them. They consider innovations in the fields of environment and sustainability important. They want to understand the benefit of innovations and want to see consumers more closely involved, in order to achieve more transparent communication from the food sector.

- **Technophile, pragmatic** consumers are interested in innovations in general. However, they are hardly interested in food innovations. They have a somewhat sceptical attitude towards them without categorically rejecting them and treat them pragmatically. They do not have problems handling new technical devices.
CONCLUSIONS DERIVED FROM THE SURVEY

The communication of innovations has been neglected

Neither science nor commerce have given sufficient importance to the topic of communicating food innovations in a way relevant for consumers.

Consumers perceive food innovations very differently and assess them in a variety of ways, although a great many consumers are interested in the topic. However, they perceive innovations in a different way to the experts. From the consumer’s viewpoint, an innovation needs to have a personal or social benefit, i.e. it should have a meaningful impact.

If a topic is not part of consumers’ daily lives, it is unlikely to determine their thinking. The novelty of an innovation must be both perceptible and beneficial for consumers. Only those who are aware of innovations can perceive them as such.

The best way to communicate food innovations is to highlight their health benefit and their contribution towards sustainability. The typology derived from this survey will facilitate a better understanding of the various groups. It is now important to prepare information that will appeal to these target groups.

The majority of consumers do not dispute the fact that technological innovations are important and necessary for both commerce and society. By linking food innovation with the topics of health and resource efficiency, which are particularly meaningful for consumers, the agriculture and food sector can greatly improve how it communicates food innovations to society at large.
### Socio-demographic structure

<table>
<thead>
<tr>
<th>Information in %</th>
<th>Interested, sceptical n = 172</th>
<th>Interested, supportive n = 241</th>
<th>Disinterested, indifferent n = 252</th>
<th>Participating, critical n = 134</th>
<th>Technophile, pragmatic n = 207</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male</td>
<td>54</td>
<td>56</td>
<td>46</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>46</td>
<td>44</td>
<td>45</td>
<td>44</td>
</tr>
<tr>
<td>Age Ø</td>
<td>Low</td>
<td>25</td>
<td>25</td>
<td>22</td>
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<tr>
<td></td>
<td>Medium</td>
<td>36</td>
<td>44</td>
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<tr>
<td></td>
<td>High</td>
<td>48</td>
<td>40</td>
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<td>38</td>
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<tr>
<td>Income</td>
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<td>35</td>
<td>26</td>
<td>42</td>
<td>41</td>
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<tr>
<td></td>
<td>€2,000 - €9,999</td>
<td>51</td>
<td>31</td>
<td>49</td>
<td>46</td>
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<tr>
<td></td>
<td>€4,000 and above</td>
<td>14</td>
<td>14</td>
<td>8</td>
<td>8</td>
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<tr>
<td>Percentage of 1-person household</td>
<td></td>
<td>25</td>
<td>26</td>
<td>25</td>
<td>24</td>
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<tr>
<td>Percentage of households with children ≤ 18</td>
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<td>35</td>
<td>35</td>
<td>36</td>
<td>36</td>
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<tr>
<td>Marital status</td>
<td>Married</td>
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<td>35</td>
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<tr>
<td></td>
<td>In a partnership</td>
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<td>12</td>
<td>24</td>
<td>25</td>
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<tr>
<td></td>
<td>Single</td>
<td>30</td>
<td>24</td>
<td>34</td>
<td>33</td>
</tr>
<tr>
<td>Preferred party among top 3*</td>
<td>CDU</td>
<td>22</td>
<td>15</td>
<td>18</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>SPD</td>
<td>19</td>
<td>19</td>
<td>22</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>Bündnis 90</td>
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<td>25</td>
<td>26</td>
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<td></td>
<td>Bündnis 90</td>
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<td>Bündnis 90</td>
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<td>16</td>
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<td></td>
<td>CDU</td>
<td>15</td>
<td>15</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Die Linke</td>
<td>7</td>
<td>7</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>DIE LINKE</td>
<td>27</td>
<td>27</td>
<td>26</td>
<td>26</td>
</tr>
<tr>
<td>Perceived party among top 3*</td>
<td>Don’t know</td>
<td>21</td>
<td>21</td>
<td>21</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>I wouldn’t vote</td>
<td>15</td>
<td>15</td>
<td>14</td>
<td>14</td>
</tr>
</tbody>
</table>

*Percentages are based on the valid responses (excluding “don’t know”, “I wouldn’t vote” and “no response”)

### Perception of innovations

**F202: Where have you obtained information about food innovations during the last 12 months?**

Information is % of multiple answers

<table>
<thead>
<tr>
<th>Information</th>
<th>Interested, sceptical</th>
<th>Interested, supportive</th>
<th>Disinterested, indifferent</th>
<th>Participating, critical</th>
<th>Technophile, pragmatic</th>
</tr>
</thead>
<tbody>
<tr>
<td>TV</td>
<td>+4</td>
<td>+6</td>
<td>+6</td>
<td>+5</td>
<td>0</td>
</tr>
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<td>-3</td>
<td>+4</td>
<td>-1</td>
<td>+3</td>
<td>-9</td>
</tr>
<tr>
<td>Online media</td>
<td>-3</td>
<td>-13</td>
<td>-10</td>
<td>+12</td>
<td>-8</td>
</tr>
<tr>
<td>Family / friends / acquaintances</td>
<td>+1</td>
<td>+2</td>
<td>+10</td>
<td>-5</td>
<td>+5</td>
</tr>
<tr>
<td>Social networks</td>
<td>+9</td>
<td>+3</td>
<td>-6</td>
<td>-10</td>
<td>+5</td>
</tr>
<tr>
<td>Environmental and/or animal protection organisations</td>
<td>+1</td>
<td>+6</td>
<td>-10</td>
<td>+15</td>
<td>-6</td>
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<tr>
<td>Science</td>
<td>+3</td>
<td>-10</td>
<td>+11</td>
<td>-3</td>
<td>+3</td>
</tr>
<tr>
<td>Radio</td>
<td>+5</td>
<td>+4</td>
<td>-7</td>
<td>-2</td>
<td>+1</td>
</tr>
<tr>
<td>Independent testing institutes</td>
<td>+1</td>
<td>+6</td>
<td>-7</td>
<td>+4</td>
<td>-3</td>
</tr>
<tr>
<td>Nutrition experts</td>
<td>+2</td>
<td>+3</td>
<td>-4</td>
<td>-3</td>
<td>0</td>
</tr>
<tr>
<td>Federal government</td>
<td>+2</td>
<td>+1</td>
<td>-1</td>
<td>-1</td>
<td>0</td>
</tr>
<tr>
<td>Other media</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
<td>-1</td>
</tr>
<tr>
<td>Not aware of any innovations</td>
<td>-10</td>
<td>-11</td>
<td>+18</td>
<td>-3</td>
<td>+4</td>
</tr>
</tbody>
</table>

Positive difference from total (>= 10%)

Negative difference from total (>= 10%)

**F203: In which media would you personally like to see more information on food innovations?**

Information is % of multiple answers

<table>
<thead>
<tr>
<th>Information</th>
<th>Interested, sceptical</th>
<th>Interested, supportive</th>
<th>Disinterested, indifferent</th>
<th>Participating, critical</th>
<th>Technophile, pragmatic</th>
</tr>
</thead>
<tbody>
<tr>
<td>TV</td>
<td>-11</td>
<td>+10</td>
<td>-11</td>
<td>+10</td>
<td>0</td>
</tr>
<tr>
<td>Daily newspapers</td>
<td>+1</td>
<td>+3</td>
<td>+15</td>
<td>+15</td>
<td>0</td>
</tr>
<tr>
<td>Special internet websites</td>
<td>-7</td>
<td>-6</td>
<td>-6</td>
<td>-6</td>
<td>0</td>
</tr>
<tr>
<td>Radio</td>
<td>-5</td>
<td>+5</td>
<td>-5</td>
<td>+5</td>
<td>-1</td>
</tr>
<tr>
<td>Consumer trade fairs</td>
<td>-4</td>
<td>+10</td>
<td>-10</td>
<td>+10</td>
<td>-6</td>
</tr>
<tr>
<td>Visits to farms</td>
<td>+1</td>
<td>+7</td>
<td>-5</td>
<td>+2</td>
<td>-6</td>
</tr>
<tr>
<td>Visits to companies</td>
<td>+2</td>
<td>+8</td>
<td>-8</td>
<td>+2</td>
<td>-5</td>
</tr>
<tr>
<td>Trade magazines</td>
<td>+2</td>
<td>+8</td>
<td>-8</td>
<td>+2</td>
<td>-5</td>
</tr>
<tr>
<td>Personally in conversations</td>
<td>+7</td>
<td>+3</td>
<td>-6</td>
<td>-1</td>
<td>-3</td>
</tr>
<tr>
<td>Open days at universities, etc.</td>
<td>0</td>
<td>+5</td>
<td>-7</td>
<td>+5</td>
<td>-2</td>
</tr>
<tr>
<td>Trade fairs</td>
<td>+2</td>
<td>+6</td>
<td>-7</td>
<td>+2</td>
<td>-3</td>
</tr>
<tr>
<td>Contact in social networks</td>
<td>-1</td>
<td>+3</td>
<td>-5</td>
<td>+5</td>
<td>-2</td>
</tr>
<tr>
<td>Other media</td>
<td>-1</td>
<td>0</td>
<td>-1</td>
<td>+2</td>
<td>0</td>
</tr>
<tr>
<td>No information required</td>
<td>-2</td>
<td>-5</td>
<td>-10</td>
<td>-5</td>
<td>0</td>
</tr>
</tbody>
</table>

Positive difference from total (>= 10%)

Negative difference from total (>= 10%)
APPENDIX

Positive innovations

F105: When you think of innovations in the food sector (agriculture, manufacturing, processing and retail), which innovations did you perceive as positive over the last few years?

Information in % of open questions

<table>
<thead>
<tr>
<th>Positive Innovations</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural, organic cultivation / more organic products</td>
<td>10</td>
</tr>
<tr>
<td>Labelling of foods</td>
<td>4</td>
</tr>
<tr>
<td>Sustainable, environment-friendly production, packaging</td>
<td>4</td>
</tr>
<tr>
<td>Natural livestock farming / better animal protection</td>
<td>3</td>
</tr>
<tr>
<td>More vegetarian and vegan products</td>
<td>2</td>
</tr>
<tr>
<td>New machines and techniques for reducing workloads</td>
<td>2</td>
</tr>
<tr>
<td>New products / wider variety / product diversity</td>
<td>2</td>
</tr>
<tr>
<td>Increased sale of regional products</td>
<td>2</td>
</tr>
<tr>
<td>Fewer pesticides / preservatives / artificial additives</td>
<td>1</td>
</tr>
<tr>
<td>Fresh, healthy, high-quality foods</td>
<td>1</td>
</tr>
<tr>
<td>Inspections of food / production</td>
<td>1</td>
</tr>
<tr>
<td>Longer product shelf life</td>
<td>1</td>
</tr>
<tr>
<td>Consideration of food intolerances</td>
<td>1</td>
</tr>
<tr>
<td>New retail sales channels / faster transportation / online purchasing options</td>
<td>1</td>
</tr>
<tr>
<td>Other</td>
<td>6</td>
</tr>
<tr>
<td>No food sector innovations named</td>
<td>2</td>
</tr>
<tr>
<td>I cannot think of any positive food innovations</td>
<td>44</td>
</tr>
<tr>
<td>Don't know / no response</td>
<td>22</td>
</tr>
</tbody>
</table>

Basis: n = 1,006

Negative innovations

F106: And which innovations in the food sector (agriculture, manufacture, processing and retail) did you perceive as negative over the last few years?

Information in % of open questions

<table>
<thead>
<tr>
<th>Negative Innovations</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Genetic engineering in general</td>
<td>8</td>
</tr>
<tr>
<td>Increased cruelty to animals / factory farming</td>
<td>6</td>
</tr>
<tr>
<td>Genetically modified foods</td>
<td>6</td>
</tr>
<tr>
<td>The use of chemicals, medications, artificial preservatives</td>
<td>4</td>
</tr>
<tr>
<td>Too many unhealthy foods / low-quality foods</td>
<td>3</td>
</tr>
<tr>
<td>Insufficient labelling / Seals of quality with too little information</td>
<td>2</td>
</tr>
<tr>
<td>Low-quality meat / rotten meat</td>
<td>1</td>
</tr>
<tr>
<td>Dissatisfaction with price developments</td>
<td>1</td>
</tr>
<tr>
<td>Lack of sustainable production / environmental pollution</td>
<td>1</td>
</tr>
<tr>
<td>Too much (plastic) waste / poor packaging</td>
<td>1</td>
</tr>
<tr>
<td>Trend towards the increasing number of vegetarian and vegan organic products bothers me</td>
<td>1</td>
</tr>
<tr>
<td>TTIP free trade agreement</td>
<td>1</td>
</tr>
<tr>
<td>Criticism of new machines / production techniques / mass production</td>
<td>1</td>
</tr>
<tr>
<td>Food design, reconstituted meat, imitation cheese</td>
<td>1</td>
</tr>
<tr>
<td>Other</td>
<td>5</td>
</tr>
<tr>
<td>No food sector innovations named</td>
<td>3</td>
</tr>
<tr>
<td>I cannot think of any negative food innovations</td>
<td>43</td>
</tr>
<tr>
<td>Don’t know / no response</td>
<td>23</td>
</tr>
</tbody>
</table>

Basis: n = 1,006

Attitudes towards food innovations

F107: To which extent do you agree with the following statements regarding food innovations?

Information in %; average value

<table>
<thead>
<tr>
<th>Agrees or disagrees</th>
<th>Fully agree</th>
<th>Tend to agree</th>
<th>Cannot decide</th>
<th>Tend not to agree</th>
<th>Do not agree in the least</th>
</tr>
</thead>
</table>

Technological innovations are necessary to reliably supply the world’s population with food.
Food innovations are an economic opportunity for agriculture, manufacturing and retail.
I look forward to future technological food innovations with great curiosity.
I personally benefit from some food innovations.
I am very interested in technological food innovations.
Naturality and technological food innovations are difficult to combine.
I am generally sceptical towards technological food innovations.
I am generally opposed to technological food innovations because they could damage my health.

Basis: n = 921 – 984

Die Lebensmittelwirtschaft e.V. - Essbare Innovationen | rc - research & consulting GmbH | 05.08.2015
DESCRIPTION OF THE INNOVATION SURVEY
The survey evaluated the results gained from questioning 1,006 participants. In order to obtain an approximately representative sample of the population, quota variables for age, gender, federal state and level of education were predetermined. The survey was conducted online on consumers living in German private households (at least 18 years old) during the period from 9 July to 16 July 2015.

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