

UNIVERSITEIT TWENTE.

Crowdsourcing for radical product innovation?

Qualitative research on consumer involvement in the Dutch food industry

Master thesis Business Administration

Jasper Broer

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"It's not the consumer's job to know what they want" (Steve Jobs answering the question if he had conducted market research on the Ipad)

"If I would have asked consumers what they wanted, they would have said a faster horse".
(Henry Ford)

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Public version

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Acknowledgements

From the first of May, I started an internship at Sara Lee at a marketing department. I had finished the courses of the International Management master; however the innovation courses during the master had interested me more. During the summer I spoke with many people to design an interesting research. And now, more than a year later, this thesis is finished. I can conclude that writing a thesis in combination with doing an internship, setting up your own business and working fulltime, is a hell of a job. However, with the help of many people and a very interesting research subject, I enjoyed most of the time conducting this research.

One of the most interesting outtakes for me is my ever changing opinion about the topic during this research. At the start, I had an opinion about the added value of consumers for companies and during the research, this continuously changed. Reading articles and conducting interviews with company representatives made me aware of the two completely different worlds of theory and practice. If you ask ten people about innovation, you will get ten different answers.

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Jasper Broer

Management summary

This study researches the involvement of consumers supporting radical product innovations in the Dutch food industry. The following central research question is formulated:

How can consumer involvement, in particular crowdsourcing, be used to support successful radical product innovations in the Dutch food industry?

Four research questions are formulated to answer this central research question. Through an analysis of eight radical product innovations, the first three research questions are answered. These questions focus on the consumer involvement technique and how the different companies organized the involvement. In order to validate the results of the specific consumer involvement technique crowdsourcing, four additional expert interviews are conducted with facilitator of research communities. These interviews are used to answer the fourth research question regarding the opportunities and challenges of crowdsourcing.

The theoretical framework describes the fields of radical product innovation, consumer involvement and crowdsourcing. This results in a conceptual model of the consumer involvement process, visualizing all relevant variables and assumed relations between the variables.

After several interviews and an extensive online research for radical new products, eight radical product innovations were selected for the case studies. These eight cases were analyzed through semi-structured interviews with company representatives and all available information online. Through three coding methods, the variable phase was identified as core category in the consumer involvement process. Through an analysis of all variables in the conceptual framework, an empirical model was developed based on the results of the case studies.

Results show that six out of the eight companies involved consumers in their innovation process. The techniques which are used are similar in each innovation phase. In the discovery phase, consumers are involved with the use of concept tests, in the incubation phase with product tests and in the commercialization phase, professional taste tests are conducted. The underlying variables however, the type of consumers, stimulus, interaction and outcome of each technique differ from each other. Four company variables are included in the analysis and these result in interesting findings. Large differences exist between established and newly found companies in the number of consumer involvements in each innovation phase and how these companies deal with confidentiality. Results did not provide sufficient data about the involvement technique crowdsourcing. In order to validate the results obtained from the case studies, four additional interviews with experts were conducted. Based on these interviews, a conceptual model was developed to explore the field of crowdsourcing for radical product innovation. Besides the importance of the innovation phase, the type of consumer and the interaction; five internal challenges for companies are identified.

This study validates the importance of the innovation phase in the consumer involvement process and that consumers are still used to test and validate products and concepts, rather than being used as sources of radical ideas. This study however identifies several new important relations in the consumer involvement process. Previous research did not include company variables in the analysis and results show that these variables influence the process to a large extent. Also the negative influence of confidentiality on the interaction represents an interesting finding. Interviews with experts and the specific characteristics of the food industry show that there are several opportunities for online consumer involvement, however offline involvement is necessary as consumers need to smell, taste and feel the product. However, with increasing opportunities for online involvement and consumers who want to be heard more and more, mostly internal issues function as barriers for crowdsourcing supporting radical product innovation.

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1.0 Introduction

1.1 Motive

Many scientists believe that firms cannot use consumers for radical product innovations. Often heard reasons are that consumers are lacking foresight, they do not know what they want and can only be used for incremental innovations. However, recent research conducted by Janssen (2011) shows that consumers can be used for radical product innovations in the food industry. In each phase of the innovation process, different techniques are analyzed by Janssen which can be used for involving consumers in the development process of radical innovations. One of these techniques is crowdsourcing. Crowdsourcing is a relatively new concept but has already gained enormous attention by scientists, companies and consumers; and it is becoming more and more important. (Whitla, 2009, Greengard, 2011) More and more important because consumers want their voices to be heard by companies. And web 2.0. has given them lots of opportunities.

The use of crowdsourcing for incremental product innovations is widely accepted and is being used by many organizations in the food industry. Everybody knows the examples of Lays and McDonalds. However, involvement of consumers supporting radical product innovations is much more complex and much less research is conducted regarding this topic. This is the motive to focus on radical product innovation instead of incremental product innovation. This paper researches the consumer involvement techniques used in the Dutch food industry and the use and potential of crowdsourcing. This is performed through eight case studies and three expert studies.

1.2 Research context

1.2.1 Consumers, Web 2.0 & innovation

In 2006, Time Magazine's choice of the person of the year for 2006 was 'You'. Synonym for the crowd or community of internet users who through their uploading of content and material and sharing of information were creating a new and improved web: Web 2.0. Similarly, from a marketing perspective, Advertising Age nominated 'the consumer' as its advertising agency of the year 2006 based on the fact that firms were increasingly turning to consumers for creative ideas and output. (Whitla, 2009, p. 18)

These two examples highlight the increasing importance of the role of consumers in product innovation. Innovation is of indispensable value for organizations. Empirical studies demonstrate that innovative firms show higher profits, higher market value, better credit ratings, higher market share, and higher probabilities of survival in the market (Banbury and Mitchell 1995, Blundell et al. 1999, Cefis and Marsili 2005, Czarnitzki and Kraft 2004, Geroski et al. 1993, Hall 2000).

Besides the importance of innovation in academic literature, innovation is also essential in daily practices. 84% of the executives say innovation is extremely important or very important to their companies' growth strategy (McKinsey 2010).

In the field of innovation, there has been a dramatic shift towards more open, democratized, forms of innovation that are driven by networks of individual users (Flowers & Henwood, 2010). This phenomenon of user innovation started 35 years ago when researchers started to systematically study innovation by end users and user firms. "At that time, the phenomenon was generally regarded as a minor oddity" (Von Hippel, 2005, p.63). At that time, according to the 'manufacturer-active paradigm, the entire sequence of activities requisite for the launch of an innovation solely belonged to manufacturers' responsibility (von Hippel, 1978). The past decades however, have shown that users often take an active role in the innovation process, testing and modifying existing products and even designing new ones themselves (Raasch, Herstatt & Lock, 2010). As von Hippel (2005, p.63) states: "Today, it is clear that user-centered innovation is a very powerful and general phenomenon".

However, do firms gain from being oriented towards, perhaps even working directly with their customers? Lilien et al (2002), Neale and Corkindale (1998), Rosenberg (1982) and Urban and von Hippel (1988) argue that established firms can improve their innovation performance by working closely with users and customers in the innovation process (Foss, Laursen and Pedersen, 2011). Also Henard and Szymanski (2001) state that understanding customer needs is a fundamental, although challenging, activity for successful innovation.

The development of user innovation through time is described in four themes across different sectors by Voss (2010), who follows Godin (2006). In the first theme, work in the early 1970s focused on scientific instruments and machinery at a time when these fields were being widely examined in the nascent innovation studies field. The second theme focused on medical instruments developed by individual practitioners. The third theme, beginning in the late 1990s, focused on the role users played in developing modifications around outdoor sporting equipment. The most recent and prodigious theme in research corresponds to the advent of the internet and the 'wider democratization of innovation' (von Hippel, 2005), and focuses on the development of digital products and tools. (Voss, 2010)

This digital development is described by Greengard (2011, p. 20): *"If one thing is entirely clear about the internet it's today's ability to democratize information and tasks is nothing short of remarkable. Increasingly, groups aggregate knowledge through wikis, track incidents during a political uprising or emergency through text messages and email, and create instant teams and organizations in order to solve tasks and accomplish work"*. This democratization of information is often applied to companies and was first used by von Hippel (2005). The democratization involves users usurping a key core competence of many manufacturers – the ability to innovate.

As the internet offers global accessibility and facilitates communication and interaction between companies and consumers for a comparatively low cost, it has become one of the major drivers for new forms of inbound openness (Afuah, 2003). This platform connecting people and allowing for participation is now known under the notion Web 2.0 (O'Reilly, 2005).

Several companies have recently used crowdsourcing. Lays used the crowd to come up with new flavors, but also to use the crowd to increase sales. The winner of the new chips taste won 1% of the revenues. Pickwick also used consumers to create a new flavor and to make consumers ambassadors of the product and brand (van Meer and Meuleman, 2011). Recently, McDonalds organized a crowdsourcing contest for inventing a new hamburger. The winner of this contest did not win any money, but he won publicity as he was showed on posters and in the television commercial (De co-creatie burger van McDonalds: de McMood, n.d.). Another recent organized contest was performed by Dove, who asked consumers to come up with a new shower crème. The winner won the lead in the promotion campaign (Winnaar Dove co-creatiecampagne gekozen, n.d.).

These cases are however, all examples of incremental product innovations. The question rises if consumers are also used for radical product innovations, as there is not much empirical research about this topic. Most researchers are supporters of involving consumers in the development of incremental products. However, the involvement of consumers to support the development of radical product innovations is a subject of debate (Janssen, 2011, p. 17).

1.2.2 Radical product innovation and consumer involvement

Radical product innovations take often years of design and development and not much research is conducted if consumers are involved in these processes. Janssen (2011) did conduct an extensive research about the involvement of consumers for the development of radical product innovations. She found fifteen appropriate consumer involvement techniques which were used by companies for radical product innovations. However, Janssen (2011, p. 177) concludes that consumer involvement is rare in radical product innovation, but that both in theory as in practice, more is possible than often is assumed.

Two of these fifteen techniques were labeled as crowdsourcing. With this technique, the company uses information technology to interact with consumers. In order to explore the use of this technique, Janssen (2011) conducted two experiments in two different companies. She concluded with *“there are challenges to be met in setting up research communities for new product development, but when these are overcome, crowdsourcing supports the generation of information for breakthrough product innovation”* (Janssen, 2011, p. 139).

Some interesting issues arise from the study of Janssen (2011) which ask to be researched in detail. In order to build a comprehensive and general theory, Janssen (2011) recommends further research on the type of consumers involved, the mediating role of a facilitator and market research agencies and how companies cope with sharing of innovations. Another interesting issue is the use of social media applications. As the use of these applications by consumers is rapidly increasing, according to Janssen (2011), these social media applications, for example online communities, are not often used in innovation programs in the food industry. This is mainly because the potential is unknown. Another study which recommends researching the role of users in radical innovations is written by Bogers, Afuah and Bastian (2010). They reviewed the current literature on user innovation and state that the understanding of why and how users innovate, can be increased by distinguishing between incremental and radical innovation.

1.2.3 Food industry

This paper focuses on the food industry in the Netherlands. This is one of the largest industries in the Netherlands. Due to the fast development of technologies and the rapidly changing markets and customers' demands, combined with increased global competition, the industry has to take up new challenges to ensure its competitive position. This forces firms to increase their innovative capacity by creating new products. (Janssen 2011)

Lagnevik et al (2004) shows that real innovations in the food sector are limited; innovations are mainly just small improvements of existing products. Only 2.2 per cent of new products are radical product innovations. According to van Boekel (2005), revolutionary, completely new products are not to be expected: innovations rather come from the functionality of food products or from the way that foods are produced. The food sector is not used to big technological innovations as seen in other sectors, like for instance the computer and consumer electronics branch (Moskowitz and Hartmann, 2008). Innovative programs focus on better taste, more convenience, health and disease prevention and less on new means to scale up production and lower the costs.

XTC (2010) divided innovation in the food market into 15 trends, which are categorized together in five groups: Pleasure, Health, Physical, Convenience and Ethics:

1. Pleasure; what arouses desire, often charged with emotional values, for example pure Arabic coffee pads. Trends: sophistication, exoticism, variety of senses and fun
2. Health; the beneficial impact on health and risks prevention, for example products enhanced with anti-oxidants. Trends: medical, natural and vegetal
3. Physical; care given to one's look, physique or mental state, for example products enhanced with ginseng. Trends: slimness, cosmetics and energy/well-being
4. Convenience; effectiveness in use and adaptation to new ways of life, for example a liquid concentrate in a downwards bottle
5. Ethics; feeling, attention focused to one's environment and on others, for example fair trade. Trends: nomadic, ecology and solidarity.

Wynstra & Van der Valk (2005) conducted a research about the different trends which have influence on food industries. One is the changing demand. There is a growing interest in convenience products due to changes in lifestyle (going out more, working longer hours, women working in addition to men or instead, focus on health). In the food industry, consumer acceptance is extremely important

(Frewer et al, 2005). People only want to put things in their mouth that they trust, so consumer attitudes about potential food risks are critical in the acceptance of new products. Since new products are occasionally developed with a new technology that consumers might consider with distrust, consumers often show a conservative attitude towards new technologies in food (Janssen, 2011). Another trend is the continuous growth of retail chains, whereby the retailers increase their power over food companies even further. More and more retailers switch to operating under the flag of an established brand name (Jumbo or Albert Heijn). These trends bring growing pressure upon food companies and force companies to innovate.

Puratos released recently the results of a survey conducted by Insites Consulting into consumer attitudes and choices to inspire future innovation within the food industry. 10 mega trends were presented: consumers want more transparency from start to finish; marketing and supermarkets need to focus on the authenticity of the story, look & feel and image; local food culture becomes more important; food becomes more portable and easy-to-eat in the future; consumers change their expectations about what is healthy based on the size, volume, shape and portion, small items can be indulging whereas health awareness grows considerable with larger food products; and consumers like more and more the walking out of the store with the feeling that they have their own personal product. (Taste/tomorrow Insites Consulting, 2012)

1.2.4 Radical product innovation cases

Eight cases are selected in order to research the involvement of consumers for radical product innovations. All these companies are working in the Dutch food industry and developed recent years a radical new product. The cases differ much from each other. The product innovations include a new beer, coffee system, chips, ingredients for meat alternatives, cookies, protein, and a new foam bottle. All revolutionary products, some technological, some fulfilling a latent consumer need, and some both. Some introductions are technology driven, and some market. The cases include innovations from large companies, but also from startups. Some companies sell their products to consumers and some companies to other companies. Six of the eight innovations focus on health, showing the increasing focus in this area. This shows the high variety of the selected cases. Interviews are conducted with founders, marketing representatives and research and development managers in order to explore the role of consumers in the development of the product.

1.3 Research objective

Different interesting trends and issues are covered in this thesis. As stated by Janssen (2011), consumer involvement in radical product innovations is rare. On the other side, consumers want their voices more and more to be heard and also more and more companies are implementing co-creation cases, innovation communities and other social media applications. Objective of this research is to analyze if these trends have changed the involvement of consumers in supporting the development of radical product innovation in the Dutch food industry. Issues as which consumers are involved and when, how consumers are involved, are intermediaries involved and how do organizations cope with sharing of innovation, are all researched in depth to provide a clear understanding of the research objective.

The goal of this thesis is to contribute to the research field of consumer involvement supporting radical product innovation.

1.4 Research questions

In order to achieve the research objective, the following central research question is formulated: *How can consumer involvement, in particular crowdsourcing, be used to support successful radical product innovations in the Dutch food industry?*

In order to structure this research and to answer the central research question, this research is divided into several steps, the research questions. Based on the theoretical framework, in which the topics of radical product innovation, consumer involvement techniques and crowdsourcing are described, the following research questions are researched in this thesis:

1. *How do companies in the Dutch food industry involve consumers for supporting radical product innovations?*

This research question focuses on the involvement techniques companies' use for developing their radical product innovation, if they involve consumers in the first place. Previous stated issues as which consumers are involved and when in the innovation phase are analyzed. This is conducted through several case studies.

2. *In which way do companies organize consumer involvement?*

This research question focuses on organizational issues. Do companies for example maintain interaction with the consumers by themselves, or do they outsource it to intermediaries. Another interesting topic is the risk of sharing innovation. These two issues follow from the recommendations from the dissertation written by Janssen (2011).

3. *To what extent do companies use crowdsourcing for radical product innovation?*

By analyzing the cases, the use of the crowdsourcing method for involving consumers is researched. Topics such as do companies use the crowdsourcing technique, why and how do they do that and does it generate different outcomes are researched.

4. *What are the problems and opportunities for companies of using research communities for developing radical product innovations?*

Based on the results of the third research question, an additional research is conducted. This final research question is researched by conducting four expert interviews with facilitators of research communities. Both the opportunities and challenges of research communities are discussed.

The first three research questions are answered with the use of case studies. These cases are carefully selected radical product innovations by companies in Dutch food industry. The final research question is analyzed through an expert study with facilitators of innovation communities.

1.5 Research method

For this research, case studies and expert studies are conducted to answer the research questions, and thus the central research question. The table below shows the research question, the corresponding research method and data source.

Table 1: research method and data source

Research question	Research method	Data source
1. Consumer involvement in the Dutch food industry	Case studies (8)	Semi structured interviews (10)
2. Organizational issues for involving consumers	Case studies (8)	Semi structured interviews (10)
3. Crowdsourcing as consumer involvement technique	Case studies (8)	Semi structured interviews (10)

4. Opportunities and challenges of innovation communities	Expert interviews (4)	Semi structured interviews (4)
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1.6 Structure of the paper

This thesis contains five chapters. In this chapter the research questions are formulated and the research context is described. In the following chapter the theoretical framework is created in which radical product innovations, consumer involvement techniques and crowdsourcing are described. The conceptual model visualizes the variables and relations between those variables. The methodology which is described in the third chapter is based on this conceptual framework. In this chapter the selection of the cases is described, the interview protocol is developed, the analysis method is described and the reliability and validity of the study are discussed. Results of the case studies and expert interviews are summarized in the fourth chapter. In this chapter the different research questions are answered. The fifth and final chapter of this thesis contains the conclusions, discussion of the results, limitations of this research and recommendations for further research.

2.0 Theoretical framework

This chapter contains an extensive literature research on the research fields of radical product innovation, consumer involvement and crowdsourcing. The review starts with an analysis of radical product innovation and how it can be distinguished from incremental innovation. The second part describes the increasingly important becoming field of consumer involvement or user innovation. A method to involve consumers is crowdsourcing. This relatively new field of research is described in the third part of this chapter. The fourth part describes the role of consumers in radical product innovations. Finally, the conceptual framework describes all variables and assumed relations between the variables described in this chapter. This is visualized in a conceptual model.

2.1 Radical product innovation

This paragraph describes the essence of radical product innovation and the difference with incremental product innovation. Further is described which levels of radical innovation exist and which phases in the development process of radical new products.

2.1.1 Definitions

Innovation has been the subject of research for many years and will be the subject for many years to come. The current need for innovation is clearly explained by Baregheh, Rowley and Sambrook (2009, p. 1324): *“Organizations need to innovate in response to changing customer demands and lifestyles and in order to capitalize on opportunities offered by technology and changing market places, structures and dynamics”*. Baregheh et al (2009, p. 1334) define innovation as: *“Innovation is the multi-stage process whereby organizations transform ideas into new/improved products, services or processes, in order to advance, compete and differentiate themselves successfully in their marketplace”*.

A distinction which is widely accepted is between incremental – and radical innovation. Nelson wrote already in 1959 about radical innovation and used it to indicate significant technological change (Nelson, 1959). According to Robertson (1967), the distinction between radical and incremental innovation emerged in the 1970s. Since that time, many different definitions are given to the two forms of innovation. Two clear and fully comprehensive definitions are formulated by Song and Montoya Weiss and McDermott and O’Connor.

Song and Montoya Weiss (1998) define incremental innovation as *“adaptation, refinement, and enhancement of existing products and/or production and delivery systems”*. And McDermott and O’Connor (2002) define radical innovations as *“development or application of significant new technologies or ideas into markets that are either nonexistent or require dramatic behavior changes to existing markets”*.

Current literature states that organizations should not choose between which form of innovation to use, but to perform both incremental- and radical innovations. This concept is called ambidexterity: *“organizations should exploit its current capabilities while simultaneously explore fundamentally new competences”* (Levinthal and March, 1993). In other words, organizations need both incremental as radical product innovations to survive.

To escape the intense competition of today’s global economy, organizations seek growth options beyond conventional new product development (O’Connor and DeMartino, 2006). Radical innovation is one such pathway. According to O’Connor and DeMartino (2006), *“Radical Innovation results in organically driven growth through the creation of whole new lines of business that bring new to the world performance features to the market and may result in the creation of entirely new markets”*. As stated before, McDermott and O’Connor define radical innovation as the development of new technologies or new ideas into markets. This is also described by Eliashberg et al (1997), who describe that radical innovation can have its source either in understanding consumer demand or in

technology superiority. These two dimensions of radical innovations, technology and consumer needs, are outlined in the next section.

2.1.2 Levels of radical innovations

Innovations are perceived differently by consumers and by firms. From a consumer perspective, innovativeness is related to new products, adoption risks and the level of change in established behavior patterns (Danneels and Kleinschmidt, 2001). Radical innovations are disruptive, which means that they alter consumer habits and behaviors. From a firm perspective, innovativeness is related to environmental familiarity and project-firm fit both in technology and marketing aspects (Danneels and Kleinschmidt, 2001).

As was stated in previous section, a radical product innovation can have its source either in technology or in consumer ideas. Urban and Hauser (1993) developed a technology-need matrix to explain the difference. A new technology to produce a product is not always viewed as radical by consumers, as consumers do not notice the change. So product innovations can be new to the firm or new to the consumer, or to both. This is showed by Janssen (2011) in a figure.

Figure 2.1: Three types of radical product innovations

Technology	New	Technologically really new	Breakthrough
	Existing	Incremental	Trend break really new
		Manifest	Latent
		Consumer need	

As can be seen in the figure, the technology dimension is divided into existing - and new technology. An existing technology means that the technology is familiar for the company and that there is no major change needed in the production process and the equipment needed to produce the product (Janssen, 2011). New technologies are not familiar for the company and a major change is needed in the production process and the equipment.

The consumer need dimension is divided into manifest - and latent needs. Manifest needs can be expressed by people when you ask for them. These products do not change consumer behavior. Latent needs cannot be directly expressed, at least not consciously, and these products lead to new consumer behavior (Janssen, 2011). This leads to three types of radical product innovations distinguished by Janssen (2011, p. 71):

1. Technologically really new product innovations. These are developed with a new technology and fulfill a manifest consumer need. These innovations are based on changes in technology.
2. Trend-break really new product innovations. These are developed with an existing technology and fulfill a latent consumer need. These innovations primarily affect behavior patterns.
3. Breakthrough product innovations. These are developed with a new technology and fulfill a latent consumer need. These innovations have a major effect on behavior patterns and are based on changes in technology.

2.1.3 Radical innovation process

The different steps in the innovation process are defined differently by many researchers. New product development processes emerged fifty years ago and have been highly popular ever since. Already in 1957 Johnson and Jones divided the NPD process into product idea, feasibility studies, prototype development, testing and validation and product launch. This is very similar with the

categorization by Janssen (2011) who reviewed the literature and made the distinction based on work of Cooper and Kleinschmidt (1993); Veryzer (1998); Tidd and Bodley (2002); O'Connor (2005) and Vuola and Hameri (2006). They divide the development process of radical product innovation in three phases: (1) the discovery phase, (2) the incubation phase and (3) the commercialization phase. Table 1 shows these three phases of the development process of radical innovations.

In the discovery phase, product opportunities are identified, ideas are generated and the readiness of new technologies is researched. In this phase the first concepts are generated and the first market assessments are often performed. Opportunities are selected and feasibility studies are conducted. In the incubation phase, product concepts are developed into business propositions and the first prototypes are developed and tested. Tests can be performed both inside as outside the organization. Especially the development of the product and the first tests are central. In the final phase, the commercialization phase, the prototype moves out of the R&D department to the operation unit for 'scaling up' and the technology is re-defined for a specific application in mass production. In this final phase, the last tests can be performed, the final business analysis can be made and the product is commercialized for launch, the end of the process. (Janssen, 2011)

2.2 User innovation

Already in the introduction a description is given of the development of user innovation. From this introduction can be concluded that user innovation is a hot topic in the academic world these days and that more and more firms are using it for new product development practices.

This paragraph defines user innovation and describes the use of lead users. Two other interesting topics are also described: the use of market research agencies and the sharing of innovations.

2.2.1 Definitions

Von Hippel (2005) describes in his article the democratization of innovation. This means that users of products and services – both firms and individual consumers – are increasingly able to innovate for themselves. Von Hippel also states that a growing body of empirical work shows that users are the first to develop many and perhaps most new industrial and consumer products. The trend towards democratization of innovation is driven by two related technical trends, according to von Hippel (2005): (1) the steadily improving design capabilities (innovation toolkits) that advances in computer hardware and software make possible for users; and (2) the steadily improving ability of individual users to combine and coordinate their innovation related efforts via new communication media such as the internet.

Users can be defined as firms or individual consumers that expect to benefit from using a product or a service (von Hippel, 2005, p.64). In contrast, manufacturers expect to benefit from selling a product or a service. This paper focuses on only the individual consumer and not the firm that uses products or services of other firms. Flowers & Henwood (2010) describe in their book, 'Perspectives on user innovation', user innovation as complex and multifaceted. Innovation is in their perception, "*often a challenging, complex, and contested process with users playing a central role in the creation, shaping and diffusion of new products, services and ideas*". According to Flowers & Henwood (2010, p.1-4), "*certain forms of user innovation can lead to the most fundamental changes for organizations, markets and for public policy*".

A question asked by von Hippel (2005) relevant for the food industry is: how can or should user innovations of general interest be transferred to manufacturers for large-scale diffusion? Von Hippel proposes three general methods.

- (1) Manufacturers can actively seek innovations developed by lead users that can form the basis for a profitable commercial product

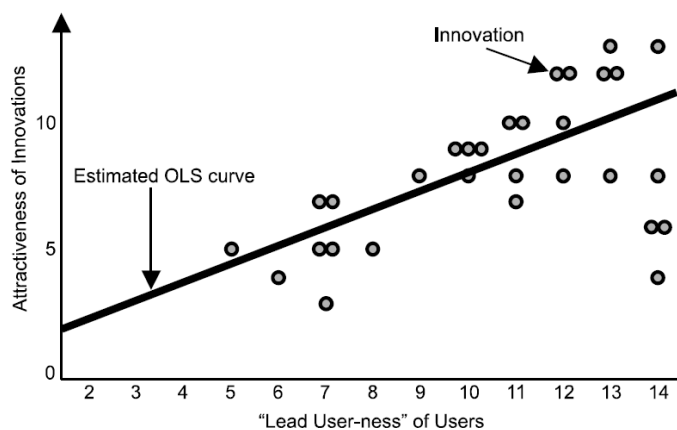
- (2) Manufacturers can draw innovating users into joint design interactions by providing them with toolkits for user innovation
- (3) Users can become manufacturers in order to widely diffuse their innovations

This paper focuses on the first two options.

2.2.2 Lead users

New product developers face the challenge to involve the ‘right’ consumers at the ‘right’ time with the ‘right’ method. Studies of innovating users (both individual and firms) show that users often have the characteristics of “lead users” (Urban and von Hippel, 1988). Lead users are ahead of the majority of users in their population with respect to an important market trend, and they expect to gain relatively high benefits from a solution to the needs they have encountered there. Urban and von Hippel (1988) found that lead users are more likely to innovate than users in general. Lead users are at the leading edge of the market; so many products they develop for their own use will appeal to other users too and so might provide the basis for products manufacturers would wish to commercialize. According to Morrison et al. (2004), the two defining characteristics of lead users and the likelihood that they will develop new or modified products have been found to be highly correlated. Franke and von Hippel showed in 2003 that the higher the intensity of lead user characteristics displayed by an innovator, the greater the commercial attractiveness of the innovation that that lead user develops. Figure 2.2 shows this.

Figure 2.2: Innovation attractiveness versus lead user-ness



(Franke and von Hippel, 2003)

Based on this figure can be concluded that organizations should use lead users for their innovations. Also Janssen and Dankbaar (2010) argue that consumers differ in the ability to which they want to make an effort to understand manifest and latent needs and look for solutions, and therefore that companies need to select participating consumers on these abilities. However, the findings of Janssen and Dankbaar (2010) indicate that companies do not use lead users. Companies just select consumers on demographic characteristics. New product developers envision the target group, and involve consumers with similar characteristics. In some cases, they also select consumers directly opposite to the target group.

Next to the distinction between lead users – non lead users, another way to distinguish between consumers is formulated by Rogers (2003). Rogers (2003) divides consumers in five groups regarding their diffusion of innovations: Innovators (2,5%), Early Adopters (13,5%), Early Majority (34%), Late Majority (34%) and Laggards (16%). There is no clear distinction which consumers are used as lead users, but mainly innovators and early adopters are categorized as lead users.

Lettle (2007) explored which users are capable to contribute in distinct phases of radical innovation process and how to interact with them. He found that users should have a high motivation toward new solutions, are open to new technologies, possess diverse competencies and are embedded into a very supportive environment. Based on previous work, Jespersen (2010) summarized different types of users in relation to several phases in the development process:

- Lead users; creative and innovative users and cover all stages in the innovation process.
- Launching users; technical experts, active and engaged in new-product projects.
- Requesting users; provide input based on their needs, form of suggestions or complaints. Input is valuable in idea generation and in the post-launch phase of existing products.
- Pioneering users; try out prototypes and share their experience. This group of users may expect rewards as motivational factor.
- First buyers; more passive user type but represent the non-users or potential buyers. Valuable in the launch stage.

2.2.3 Intermediaries

To facilitate consumer involvement, firms often rely on intermediaries. Already in 1962, Rogers (1962) found that ‘change agents’ had a powerful influence on the speed of diffusion and uptake of new products and services by households and firm adopters. In 1997, Hargadon and Sutton (1997, p. 716) studied how these agents facilitated the process of knowledge and technology transfer across people, organizations and industries. McEvily and Zaheer (1999) highlighted the role regional institutions had in providing network links and ties to firms. Howells (2006, p. 720) defined in his study for intermediation and the roles of intermediaries, innovation intermediaries as “*an organization or body that acts as an agent or broker in any aspect of the innovation process between two or more parties*”. Another definition is provided by Stewart and Hyysalo (2010, p.59): “*actors who create spaces and opportunities for appropriation and generation of emerging technical or cultural products by others who might be described as developers and users*”.

Howells (2006) found that intermediaries often perform much more activities than in previous research was found, but he did not mention explicitly intermediary relations with consumers. Much more research has been conducted on intermediaries in the field of open innovation research than in the field of user innovation. However, the different functions intermediaries have still provide a clear overview of the activities of intermediaries.

Figure 2.3 Innovation intermediation functions

Innovation intermediation functions

1. Foresight and diagnostics
2. Scanning and information processing
3. Knowledge processing and combination/recombination
4. Gatekeeping and brokering
5. Testing and validation
6. Accreditation
7. Validation and regulation
8. Protecting the results
9. Commercialisation
10. Evaluation of outcomes

(Howells, 2006, p. 720)

In a recent article by Agogue, Ystrom and Le Masson (2012), results show that intermediaries in open innovation, especially in circumstances in which no single organization is able to take on the challenge alone, perform more activities than the ‘traditional’ associated with intermediation. Traditional activities are usually categorized as either ‘brokering’ or ‘networking’ (Agogue et al, 2012). Agogue et al (2012) describe the role of an intermediary as an architect, which designs prerequisites and offers leadership in the process of joint exploration and creation of knowledge. As

in the open innovation literature intermediaries also deal with consumers, this is interesting for this thesis. Agogue et al (2012) state that an innovation intermediary can be an initiator, co-creator, manager and stakeholder at the same time. These results show that the activities of intermediaries are changing.

Also Hossain (2012) studied the role of intermediaries in open innovation. He states that online open innovation platforms such as online innovation contests and open innovation intermediaries have been increasingly growing worldwide. In this type of platforms, consumers interact with others, mostly anonymous, and with intermediaries. These intermediaries facilitate the interaction for, in general, large companies (Hossain, 2012).

Barnes and Hinton (2007, p. 63) introduce the word cybermediary for describing an online intermediary that only operates in the virtual environment. Barnes and Hinton (2007, p. 64) define a cybermediary as: *“a business organization that occupies an intermediary position in the supply chain between a buyer and a seller, and whose business is based on the use of Internet-based ICT”*. They define five roles of online intermediaries: informational, transactional, assurance, logistical and customization. Only the information function can be interesting here, this role involves the provision of information about buyers, sellers and their products. However, Barnes and Hinton (2007) do not mention innovation in their article.

From the articles described above can be concluded that no complete relevant empirical evidence exists about the role of intermediaries for user innovation.

Janssen (2011) also conducted research on the roles of intermediaries, however, specifically on the interaction with consumers. Firms often lack specialized knowledge of techniques and find it difficult to align different backgrounds of developers and consumers with each other (Janssen, 2011). For this reason intermediaries are involved. According to Janssen (2011), activities of market research agencies can be categorized in three areas, full service research, online research and psychological observations. Only five out of twelve intermediaries indicate that consumers could be used to discover future needs by observations or interaction with them. Janssen (2011) also concludes that agencies find personal experience and judgment more important than specific selection criteria for research methods. A method to involve consumers which is often used by intermediaries is the use of research communities. This method is outlined in the next paragraph.

2.2.4 Sharing of innovations

One topic in the user innovation field of research is the sharing of innovation. Many innovation researchers are surprised about this phenomenon (Von Hippel, 2005, p. 71). Empirical research namely showed that users often ‘freely reveal’ what they have developed. Harhoff et al (2003) defines this concept of free revealing as voluntarily giving up all intellectual property rights to that information by the innovator, and all interested parties are given access to it. The information has become a public good.

Reasons for doing this are summarized by von Hippel (2005) and Raymond (1999). They state that innovators often freely reveal because it is the best or the only practical option available. Hiding an innovation is unlikely to be successful for long. Other reasons are enhancement of reputation and of benefits received, and the receiving of mutual benefits if others improve or suggest improvements to the innovation.

In the cooperation between company and consumer this concept of free revealing, can become an issue. Companies involve consumers for developing and testing their new products which are not on the market yet. Free revealing the outcomes of such an involvement can be harmful for the company. Janssen (2011) also states that this issue can be a barrier for companies to involve consumers.

2.3 Crowdsourcing

The development of user innovation is partly described in the research context. A relatively new concept which has attained the attention of many researchers in this field of research is crowdsourcing. This paragraph describes the concept and one of the most used methods for involving consumers, research communities.

2.3.1 Definitions and practices

In the past, open innovation was conducted through interorganizational linkages and communities where firms collaborated with one another. However, in recent years, individuals have started to participate in open innovation by means of innovation contests, or crowdsourcing (Zheng, Li & Hou, 2011). Firms are increasingly engaging in 'crowdsourcing'. Crowdsourcing is a newly developed term which refers to the process of outsourcing activities by a firm to an online community or crowd in the form of an open call. The term crowdsourcing was introduced by Jeff Howe and Mark Robinson in a Wired Magazine article in June 2006. Howe defines crowdsourcing as:

"The act of a company or institution taking a function once performed by employees and outsourcing it to an undefined (and generally large) network of people in the form of an open call" (Howe, 2006).

This is generally been done online, however not exclusively.

Two crucial terms are 'open call' and 'undefined'. Both get the same idea according to Howe (2008), the person who you think would be best qualified to do the job, isn't always the best person to do it. At a later stage Howe added the proviso that outsourcing involved some form of payment to differentiate crowdsourcing from 'wikinomics' or 'commons-based peer production'. These involved large unrelated groups working on joint projects such as the software program Linux, or the online encyclopedia Wikipedia without relying on either market signals or managerial commands.

Another definition, although no conflicting one, is provided by Oliveira, Ramos & Santos (2010). They view 'Crowdsourcing Innovation' as *a particular way to open up the innovation process, using large networks of individuals to access, capture and explore external knowledge, technologies and competencies*; in other words to bring the "wisdom of crowds" into the company to help it innovate.

Greengard (2011, p. 20) states that crowdsourcing is based on a simple but powerful concept: *"virtually anyone has the potential to plug in valuable information"*. He argues that crowdsourcing has emerged as a viable solution for businesses, relief agencies, researchers, politicians, the military, and others looking to grab bits and bytes of information in a nontraditional and decidedly more chaotic way.

Crowdsourcing is viewed in the research as *"a particular way to open up the innovation process, using large networks of individuals to access, capture and explore external knowledge, technologies and competency"* (Oliveira, Ramos & Santos, 2010). The definition of Oliveira et al (2010) is chosen in favor of the definition formulated by Howe (2006). Howe describes the act of a company as outsourcing. Recent literature views crowdsourcing not as outsourcing, but more as co-creation/co-innovation/co-production and making use of the wisdom of crowds (Greengard, 2011). More focus is placed on the interaction between consumer and company by using the definition of Oliveira et al (2010).

The roots of crowdsourcing extend back to the 1990s. That's when individuals and institutions began volunteering spare computing cycles to help solve major research projects involving everything from mathematical formulas to medical problems (Greengard, 2011). This community-based approach extended to wikis and other collaboration tools in the age of the internet. Crowdsourcing is nowadays a disruptive tool. *"Normally, business, science and high-tech development takes place in fancy laboratories or in academic ivory towers. The idea of taking the development process out to the public is alluring yet intimidating. When such a powerful technology is unleashed it leads to unpredictable and sometimes surprising results"*, states Lee, currently director of research at Microsoft (Greengard, 2011). Famous web 2.0 companies nowadays are Youtube, which uses the

crowd to provide it with its own content and the online community MySpace, a well-recognized user-driven web business (Whitla, 2009).

Much of the initial crowdsourcing tasks that were first introduced involved computing related activities. Whitla (2009) researched the application of crowdsourcing to marketing practice but also found that there is not any significant literature on the subject yet. According to Whitla (2009, p. 19), firms use crowdsourcing to get input and advice on their own product development efforts from existing end-users, and experts who may be able to solve a certain scientific or design problem. Other firms have challenged crowdsourcing communities to design their own products and services and to provide ideas.

An example is Innocentive. This company was also involved in the case study conducted by Barnes and Hinton (2007). This is a crowdsourcing company specialized in scientific solutions to Fortune 500 companies, They pay an annual fee (starting at US\$100) for access to its community of crowdsourcers plus a percentage of the fee paid to any individual crowdsourcer who successfully solves one of the firms posted tasks (Rigby, 2007). Another example is Google, which offered up to ten million dollars for those who develop innovative applications for their new mobile phone operating system Android (Trendwatching, 2007).

Another field in which crowdsourcing can be used is advertising and promotions. Cosmetics firm L’Oreal turned to users of current TV, with a challenge to develop a television ad for a new brand of eye shadow. The winning ad was developed by a user for a cost of US\$1.000 compared to an estimated US\$164.200 charge that the firm would normally have paid for such a spot (Whitla, 2009). A different approach of crowdsourcing is to use it for marketing research. Springwise.com for example, maintains a network of over 8000 trend-spotters worldwide who contact the firm when they come across interesting new products or business models. The firm then rates and assesses the report for their validity and interest and makes payments for those it accepts. This approach may be particularly suited to collecting expert information (Whitla, 2009).

2.3.2 Advantages, disadvantages and challenges

According to Howe (2006), the advantage for a firm of outsourcing to a crowd rather than performing operations in-house is that firms can gain access to a very large community of potential workers. These workers have a diverse range of skills and expertise and are willing and able to complete activities within a short time-frame and often for a much reduced amount of money as compared to performing the task in-house.

James Surowiecki wrote in 2004 a book, *The Wisdom of Crowds*. Based on empirical investigations, he finds that *‘under the right circumstances, groups are remarkable intelligent, and are often smarter than the smartest people in them’*. According to Surowiecki (2004), the wisdom of crowds is derived not from averaging solutions, but from aggregating them. *“The web provides a perfect technology of aggregating millions of disparate, independent ideas in the way markets and intelligent voting systems do, without the dangers of ‘too much communication’ and compromise”* (Surowiecki, 2004, p. 19).

Oliveria et al. (2010) believe that crowdsourcing is not only useful in creating inventions (the first stages of the innovation process), but is also useful in converting them in innovations (the latter stages of the innovation processes). According to Greengard (2011, p. 22) *“Clearly, crowdsourcing is here to stay. It is changing the way governments, corporations, and others tackle complex issues and problems. It is leading to an entirely different mindset about how product development, problem solving, and decision making take place”*.

According to Meier, *“crowdsourcing is very efficient – with the right community in place – at gathering information quickly and effectively”*. It can help speed response and cut through the confusion that occurs during the initial stage of a disaster. It can quickly fill the information gap. What’s more, he says, traditional surveys and techniques require more time and expense – often with less impressive results.

However, the concept isn't without controversy. *"When anyone can join the fray, bad data and faulty observations can get tossed into the mix"* (Greengard, 2011, p.20). Some organizations have found that crowdsourcing is expensive and unreliable. Jeff Howe states that *"sometimes crowds can be wise, but sometimes they can also be stupid"*. For crowdsourcing to be effective tasks need to be focused and clearly explained and the firm needs to have procedures in place for effectively filtering and considering ideas that come in (Hempel, 2007).

Meijer says that concerns about the accuracy of data aren't unfounded. *"One of the challenges is developing trusted sources"*. Some errors and inaccuracies are inevitable, even from well-meaning participants, so you need to build in a margin for error. Another challenge is publicizing a crowdsourcing platform and establishing a network of volunteers. It's a task that requires significant money, time, and effort – something that many nongovernmental organizations lack.

Doan et al. (2011) describe in their article four challenges regarding crowdsourcing: how to recruit and retain users, what contributions can users make, how to combine user contributions to solve the target problem and how to evaluate users and their contributions. One of these issues is also pointed out by Zheng, Li and Hou (2011): how to design an effective crowdsourcing contest to encourage problem solvers' participation. Also Janssen (2011) names three issues which need attention: incentives and motivation, openness and information sharing, type of consumer and cross-functional interaction with consumers.

2.3.3 Innovation communities

A method which is more and more used to involve consumers in the innovation process of companies is the use of research communities, or innovation communities. Due to the possibilities of the internet, the number of innovation communities increased significantly last decade (Surowiecki, 2004; Sawhney et al., 2005; Erat et al., 2006). This form of involving users is thus gaining more and more attention these days.

According to von Hippel (2005), it is important for users to find ways to combine and leverage their efforts. Users can achieve this by engaging in many forms of cooperation. There are two forms: (1) direct, informal user-to-user cooperation and (2) organized cooperation, with users joining together in networks and communities that provide useful structures and tools for their interactions and for the distribution of innovations.

Innovation communities can be defined as *"communities of user innovators which provide platforms for users, to openly and voluntarily communicate with each other regarding innovations they are working on either collectively or independently"* (Franke and Shah, 2003). Another definition is provided by Wellman et al. (2002) and von Hippel (2007). They define user communities as *"horizontal user networks that consist of user nodes inter-connected by information transfer links which may involve face-to-face, electronic or any other form of communication that provide members sociability support, a sense of belonging and social identity"*. According to von Hippel (2005), innovation communities can increase the speed and effectiveness with which users and also manufacturers can develop, test and diffuse their innovations.

In Janssen's (2011) research, she also conducted a research on market research agencies. She found that three out of twelve research agencies which participated in the study, were experimenting with research communities.

In most cases, both firms and community members benefit from the innovation communities. However, there can also be a type where community innovations can be beneficial for users and at the same time harmful for manufacturers. These are called 'outlaw innovation communities'. These communities create and disseminate innovations that not only conflict with manufacturers' intentions of the usage of the original product, but also violate firms intellectual property rights (Flowers, 2011). Outlaw communities can involve hacking and disabling of security mechanisms, enabling hackers and pirated programs on the now unprotected hardware. But also modifying and

hacking consoles for example to gain access to functionalities not provided by the manufacturer. Two kinds of users are being distinguished by Mollick (2004). He finds that user innovators are intrinsically motivated by the desire to discover and innovate, rather than for the sake of theft. Adopters, on the other hand, are more often 'vandals', who are motivated to adopt an outlaw innovation to gain unauthorized access to their product's system for pirate behavior.

Schulz & Wagner (2008) have investigated these outlaw community innovations and draw two conclusions. On the one hand, manufacturers benefit of the existence of outlaw communities as they provide complements otherwise not available to their proprietary product. Because these outlaw communities exist, they attract more people to that community. On the other hand, participants are also interested in pirate behavior. Outlaw communities provide them with such tools to engage in that behavior which is harmful for manufacturers. Much research is needed to weigh the benefits and costs for manufacturers/companies from outlaw communities (Schulz & Wagner, 2008).

2.3.4 Crowdsourcing in the Dutch food industry

According to Janssen (2011, p. 140), examples of crowdsourcing as part of the innovation task in the food industry are rare. And most of these examples include incremental product innovations. Franke and Shah (2003) observed the behavior in four different types of communities in which members were engaged in innovation activities. One in seven (14, 5%) of the innovations was considered by the users to be a completely new product. Also Jeppesen and Frederiksen (2006) and Whitla (2009) state that crowdsourcing leads in most cases to step-wise improvements of products. However, under the right conditions, *'crowdsourcing may positively contribute to the competitive advantages of a firm and lead to the development of a radically different type of product'*.

Van Meer and Meuleman (2011) describe in their book 'De C2B Revolutie' some recent crowdsourcing cases in the Dutch food industry. Lays for example, introduced 'Maak de Smaak'. Lays involved consumers to come up with new flavors. The winner won 25.000 euro's and 1% of the profit. More than 300.000 consumers were involved and almost 700.000 ideas were generated. Another example is Pickwick. Pickwick used a co-creation process to create a new black tea flavor but also to present this new tea playful and believable to the rest of the Netherlands. 25 consumers out of hundreds of applications from Hyves were invited for three intensive days. The co-creation team members transformed during the process from passive fans to real ambassadors of the new product (van Meer and Meuleman, 2011).

Other examples are McDonalds, who asked its consumers to create a new hamburger, Heineken, who asked different clubbers to invent the new nightclub of the future and Dove, who asked its consumers to create their own shower crème.

However, these examples all represent incremental product innovations. The next chapter discusses crowdsourcing for radical product innovation.

2.3.5 Social Media

The paragraph about innovation communities is based on work which was conducted before the rise of the social media phenomenon. Social media has brought about a new generation of empowerment and smart consumers (Constantinides and Fountain, 2007). Such consumers demand a greater and more substantial contribution to the innovation process, customized products and a voice in the innovation process. Hoyer et al (2010) also states that one important outcome of this increased consumer empowerment, is that consumers now desire to play a greater role in the process of value creation. This increased consumer empowerment is referred to as co-creation. However, in recent years the focus shifted for some companies from co-creation to collaboration. Structural collaboration between consumer and company becomes more and more important and means *"the integration of the voice of the consumer in all decision making flows of your company"* (Van Belleghem and De Ruyck, 2012).

Social media has made it possible for companies to engage with their audience and stimulate insightful on an ongoing basis, most of the times in the form of online research communities (Schillewaert et al, 2011). By applying social media techniques, the crowd can be assembled in an asynchronous and long term setting (Schillewaert et al, 2011).

Constantinides and Fountain (2007) define the form of innovation through crowdsourcing co-innovation. Co-innovation can take two basic forms: the amateur innovator (customers willing to participate and help business in exchange of nothing) and the professional innovator (specialists who in their free time are working in solving technical or management problems for a fee). Next to the online communities, which were outlined before, more channels can be used to involve the consumer in the innovation process and to harness to creativity of consumers. Constantinides and Fountain (2008) present a basic classification of five categories of Web 2.0, based on application types:

1. Blogs
2. Social networks
3. Content communities
4. Forums/bulletin boards
5. Content aggregators

Contrasting to the literature stated above about the increasing importance of consumer involvement is the report by the Social media monitor (2011). This report states that businesses are still skeptical about co-innovation. This is because companies fear the unknown and becoming too transparent. Constantinides (2012) states that business do not need to worry much about revealing secrets, as we already live in the era of openness and full transparency.

2.4 Consumer involvement for radical product innovation

As is stated several times in this thesis, almost all crowdsourcing literature and cases represent incremental innovations. The many differences between incremental- and radical product innovations indicate that also consumer involvement at each innovation is different. This paragraph describes first the available literature specifically on consumer involvement at radical product innovation. Secondly, the relevant variables in the process of radical product innovation and consumer involvement are described. In the conceptual framework the relations between these variables are visualized.

2.4.1 Consumer involvement for radical product innovation

Most researchers are supporters of involving consumers in the development of incremental product innovations. However, the involvement of consumers to support the development of radical innovations is a subject of debate. Critics state that consumers do not know what they want in the future and cannot formulate their needs, consumers are lacking foresight and cannot imagine something that does not exist, consumers can only make suggestions or add value for small incremental improvements of existing products and firms can lose their position of industry leadership if they listen too carefully to their customers (Janssen & Dankbaar, 2010).

Supporters however state that it is very well possible for consumers to support the development of radical product innovations. In such situations, consumers have to be stimulated and encouraged to step 'out of their box', and not to be restricted to technological possibilities. Some argue that a high level of consumer involvement is required for the development of radical product innovations, and user interaction is critical.

Some scholars have pointed out that it is of little value to conduct traditional consumer research at the beginning of development. It is not yet clear who the customer is and the market has never experienced the features of new technology. Instead, it is better to develop effective learning

systems. Lynn et al (1996) states that 'really new products' will likely involve extensive consumer education and iterative learning from the market as customer requirements and technological capabilities co-evolve' will result in higher levels of success.

Users can be involved in each phase of the development process, but the focus and content is different in each phase. In the first phase, the focus is on the identification of product opportunities, consumer needs and on learning about new markets. According to Gassmann et al (2006), consumers are from the start to enrich and ensure the relevance of new products. In the incubation phase, the focus is on the design of the prototype, the technology and the first try-outs of the product. In the commercialization phase, consumers are involved for clarifying target markets and to forecast sales (Veryzer, 1998).

Researchers and practitioners vary in their opinion about the phase in which consumers should be involved and also for which kind of innovation consumers should be involved. Incorporating the voice of the consumer in the early stages of new product development is according to van Kleef (2005) a critical success factor. However, high levels of confidentiality can restrict the involvement of consumers when companies want to protect their information and knowledge (Janssen, 2011).

2.4.2 Consumer involvement techniques

As was stated in the introduction, understanding and involving consumers is a fundamental, although challenging, activity for successful innovation. Firms have used several techniques to gain insight into their consumer's needs and to develop highly successful new products. Traditional and non-traditional techniques are distinguished. Traditional methods include customer surveys and focus groups and ethnography, contextual inquiry and empathic design are labeled as non-traditional research approaches. Janssen (2011) reviewed this literature and found fifteen techniques which are appropriate to proactively involve consumers in radical product innovation. Four dimensions were used to distinguish these techniques: participants, stimuli, interaction and outcome. Figure 2.4 shows these four dimensions and its requirements and appendix F provides an explanation of these requirements. (Janssen, 2011, p. 87) These four dimensions are used to analyze the methods companies use to involve consumers.

The first dimension concerns the participants. Both company and consumer participants are distinguished by Janssen (2011). Janssen (2011) uses the classification of Rogers (2003), which is described in paragraph 2.2.2, for distinguishing between consumer participants.

Two requirements of the second dimension stimuli are distinguished: type and familiarity. Van Kleef et al (2005) define two types of stimuli, product-driven stimuli and need-driven stimuli, to guide participants in revealing their needs. With product-driven stimuli, consumers are confronted with concepts of, or products. Consumers are exposed to problems with need-driven stimuli. Familiarity is defined by Alba and Hutchinson (1987) as the number of product related experiences that have been accumulated by the consumer. The stimulus can be recognized by the consumer (familiar) or not (unfamiliar).

For the third dimension, interaction, three requirements are distinguished by Janssen (2011): type, level and deriving of information. The interaction between consumers and company can be structured, predetermined choices, or unstructured. Three levels of involvement for consumers are identified by Kaulio (1998) ranging from low involvement to very active involvement: for, with and by. Information can be derived directly or indirectly (van Kleef et al, 2005).

Finally, Janssen (2011) identifies three types of information as outcome of the involvement: explorative, experimental and exploitable.

Janssen (2011) related the dimensions of each technique to the different phases and types of radical product innovation to define which technique would be most appropriate for which type of radical innovation and in which phase. This resulted in six possible situations. This overview is placed in appendix G. As can be seen, some techniques are appropriate in more than one situation.

Two of the fifteen techniques are labeled as crowdsourcing and are both applicable for breakthrough innovations: crowdsourcing design and crowdsourcing development. Crowdsourcing design is defined by Janssen (2011) as:

“Consumers are integrated into the design process by using information technology; they test really innovative products for which little consumer experience exists and market research is unclear”.

Crowdsourcing development is defined as:

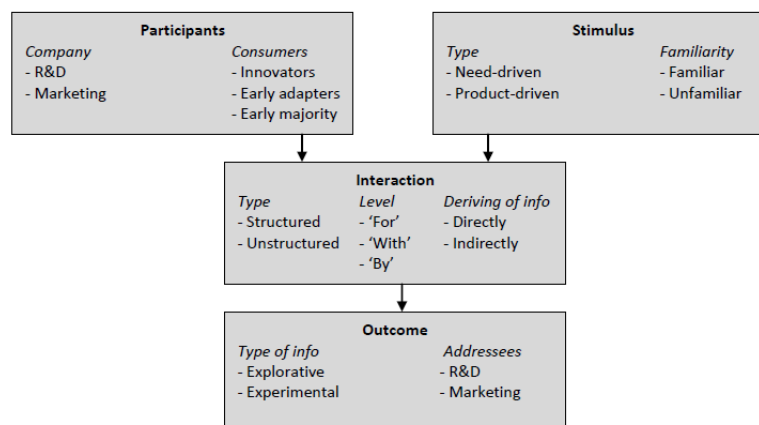
“Consumers are integrated into the development process by using information technology; they develop products for relatively small markets that are further developed by new product developers into production-grade specifications”.

Janssen (2011) conducted two experiments with these two crowdsourcing techniques and concluded that the techniques are very applicable for the generation of information for breakthrough innovation projects. Three success factors are:

- (1) the longer the interaction period, the better
- (2) create the possibility to respond pragmatically to consumer information
- (3) promote mutual learning, live contact with the consumer makes it possible to react to each other and stimulate further thinking, especially in the open and unrestricted context of an internet community.

However, Janssen (2011, p. 171) also concludes that challenges arise which can be related to three issues. The first one concerns the purpose of involving consumers in new product development. Is the company looking for confirmation of its own thoughts or for new thoughts of consumers on new technologies? A second issue concerns the sharing of company sensitive information. A balance should be found between confidentiality and providing enough stimuli to elicit information on consumer needs. The third issue is related to the role of the facilitator. A facilitator should be responsible for the technical set-up of the platform and for the content in the community. The facilitator should be able to guarantee confidentiality since the crowd is participating in conditioned settings and to build a bridge between discrepancies in language of the various actors involved.

Figure 2.4 Dimensions and requirements of proactive consumer involvement techniques



2.4.3 Radical innovation per type in the Dutch food sector

Janssen (2011) explored in her dissertation the involvement of consumers in radical product innovations in the Dutch food sector. Twenty product innovations were selected and experts were asked to classify those in terms of newness of the product and the radicalness of the technology. For only four products, all experts (6) agreed, what shows the subjectivity of the definition for 'radical'. Janssen (2011) explored for each type of radical innovation (as is categorized in 2.1.2) the consumer involvement by analyzing three product innovations. Important to note, Janssen (2011) only analyzed

the involvement in the discovery and the incubation phase. The most relevant conclusions are drawn here below.

Technologically really new product innovations

The development of the products in this category (Frideale, Mona Schepijns and Valess) are technology driven and are based on general trends in the consumer market. Only one company involved consumers in the discovery phase by performing an open group discussion on the concept statement. In the incubation phase, all companies used a combined concept-product test. Existing products were used as stimulus to provide a reference frame.

Trend break really new product innovations

All three new products in this category (Breaker, Hero Fruit2Day and Knorr Vie) were driven by the market. In the first part of the discovery phase of all three products, no consumers were involved. The products were discussed internally and with some external contacts. All three companies involved consumers in the last part of the discovery phase to evaluate and test the concept or to develop an advertising campaign. In the incubation phase of all three products, large groups of consumers were involved to assess the product. Consumers were not involved in the earliest phases because of confidentiality reasons and they were involved to convince higher management of the potential.

Breakthrough product innovations

Consumers were involved in three breakthrough innovations (Becel pro-activ spread, Senseo and Optimel) to develop new reference frames, give face to the concept idea and to test the credibility of the claim. All three companies involved consumers in the discovery phase to test the concept, but performed the tests differently. Also in the incubation phase consumers were involved at each innovation through at-home tests. About hundred to hundred and fifty consumers had to use the product at home and were asked about their behavior and about the product.

2.4.4 Variables in the consumer involvement process for radical product innovation

This paragraph describes the relevant variables that design the consumer involvement at radical product innovations. The phase in which consumers are involved is described both in this paragraph, as in the first paragraph of this chapter. Based on the work of Janssen (2011), this variable is defined as highly influential in the process of consumer involvement.

Four variables that are influencing the consumer involvement are visualized in figure 2.4, these are the type of consumers/participants, stimulus, interaction and outcome. The theory about lead users in this chapter is applied to type of consumers/participants. Two other variables which are influencing the involvement process are the use of intermediaries and the sharing of innovations, which is further named confidentiality. The technique which is used for the consumer involvement is the final variable which is described in this chapter.

2.5 Conceptual Framework

In previous paragraphs, all relevant theory about consumer involvement and radical product innovation is described and the associated variables which influence the consumer involvement process. In this conceptual framework the assumed relations between these variables are discovered and visualized in the conceptual model to connect all aspects of this research. To create a valuable starting point for the methodology, for each research question is described which relationships between which variables are researched in order to answer the central research question.

2.5.1 Variables and their relations

In order to answer the central research question, the relationships between several variables need to be researched. In this chapter, the following variables are described: phase in which consumers are involved, involved consumers, type of stimulus, type of interaction, type of outcome, the consumer involvement technique, use of intermediaries and sharing of innovation.

Other factors that could influence the consumer involvement process are characteristics of the company. Four characteristics are included in this research and these are argued in chapter four. These are size, market- or technology driven, BtoB or BtoC, and new or established company. This results in the following list of variables:

1. Independent company variables
 - a. Size
 - b. Market or technology driven
 - c. New or established company
 - d. BtoB or BtoC
2. Innovation phase
3. Consumer involvement variables
 - a. Consumers
 - b. Stimulus
 - c. Interaction
 - d. Outcome
4. Organizational variables
 - a. Confidentiality
 - b. Intermediaries

Based on the research of Janssen (2011) can be assumed that mainly the phase in which consumers are involved influences the other variables. Assumed is that the innovation phase is influenced by independent company variables. In figure 2.5, the conceptual model is visualized. In this model the assumed relations between the variables are showed. The next part describes which relations are researched for each research question.

Research question 1: How do companies in the Dutch food industry involve consumers for supporting radical product innovations?

In order to answer the first research question, the relationships between the company variables, the phase and the consumer involvement variables are researched. For this research question are the relations between the independent company variables and the innovation phase researched. The influence of the innovation phase on consumer involvement variables is also researched.

Another interesting relationship is that between the consumers, stimulus, interaction and outcome and consumer involvement technique. Do companies select first the consumer involvement technique or do companies select the technique based on the four other variables? The variable consumer involvement technique is also analyzed to research the methods which are empirically used. In paragraph 2.4.2 possible consumer involvement techniques are described, resulting in a list of fifteen possible techniques. Also the type of consumers is researched intensively. Both Franke and von Hippel (2003) as Janssen and Dankbaar (2010) argue that companies need to select participating consumers on the ability to understand manifest and latent needs. However, findings of Janssen (2011) indicate that companies do not use lead users. This research investigates to what extent this has changed recent years. The other consumer involvement variables are researched in order to search for blueprints of consumer involvement processes.

Research question 2: In which way do companies organize consumer involvement?

For the second research question, the influence of the innovation phase and company variables on organizational issues are researched and the relation of these issues with the consumer involvement process. A frequently stated issue or challenge concerns the sharing of company sensitive

information. In the theoretical framework, many researchers are cited who formulated confidentiality risks. According to Janssen (2011), consumers are not involved in the early phases of product development because the risk of losing sensitive information to competitors is high. However, Constantinides (2012) states that companies should not worry much about revealing secrets, as we live in the era of openness and full transparency. This assumes that confidentiality is influenced by the phase in which consumers are involved and influences the consumer involvement process.

A second variable which is analyzed is the role of intermediaries. According to Janssen (2011), establishing and maintaining interaction between consumers and new product developers is vital for radical product innovation. This can be performed internal or external with the use of intermediaries. Janssen (2011) defines three roles which should be adopted by a facilitator:

- (1) A facilitator should be responsible for the technical set-up of the platform and for the content in the community
- (2) The facilitator should be able to guarantee confidentiality since the crowd is participating in conditioned settings
- (3) To build a bridge between discrepancies in language of the various actors involved

This study researches if intermediaries are used in specific phases of the innovation process and how this influences the consumer involvement process.

Research question 3: to what extent do companies use crowdsourcing for radical product innovation?

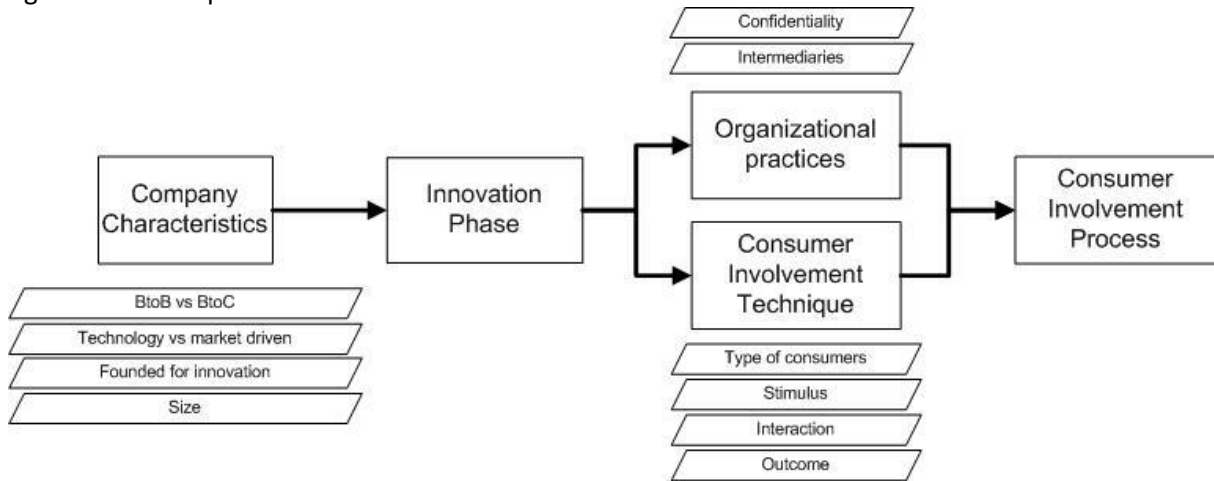
The variable consumer involvement technique is analyzed for the third research question. Two out of the fifteen techniques classified by Janssen (2011) are labeled as crowdsourcing techniques. For the third research question the use of this technique is researched and the influence on the consumer involvement process. For the first research question the influence of the phase and company characteristics on the consumer involvement characteristic are already researched and thus only the relation between crowdsourcing and consumer involvement process is researched here.

Research question 4: What are the problems and opportunities for companies of using research communities for developing radical product innovations?

Paragraph 2.2.3 describes a new phenomenon of involving consumers in the development process of new products via research communities. For the fourth research question, the variable consumer involvement technique is analyzed, however in a different way than the previous research questions. Not the empirical relationship between variables is researched for this research question, but the challenges and opportunities that exist for using research communities to develop radical product innovations. This part of the study is conducted in order to validate or to invalidate the results of the previous research questions. For this research question the relations between the consumer involvement technique crowdsourcing and other variables are discussed with experts of innovation communities. This is explained in the next chapter.

Figure 2.5 visualizes the variables and possible relations between them which are researched in this study. The lines between two variables indicate a relation between the variables, but not necessarily a causal relation. Regarding the company variables and the innovation phase is analyzed if certain companies involve more often consumers, how and in which phases. The relation between innovation phase and the consumer involvement variables is assumed causal. The characteristics of the technique are dependent on the innovation phase. For the organizational practices is analyzed if confidentiality and use of intermediaries has a positive or negative effect on the consumer involvement process and if this is influenced by the innovation phase.

Figure 2.5: conceptual model



3.0 Methodology

In the first paragraph of this methodology chapter, the different research samples are described. Based on the work by Eisenhardt (1989), the research method is described. In the third paragraph the selection of the cases is described, in the fourth paragraph the interview protocol, the method of data collection in the fifth paragraph and the data analysis method is described in the sixth paragraph. Finally, the validity and reliability of this study are described in the seventh paragraph.

3.1 Research design

In the first chapter the research design is shortly mentioned. Four research questions are formulated in order to answer the central research question. In order to answer these research questions, several case studies and expert interviews are performed. These studies are performed through qualitative interviews with managers from the different companies. The figure below shows the research questions, research method and data source of this thesis.

Figure 3.1 Research design

Research question	Research method	Data source
1. Consumer involvement in the Dutch food industry	Case studies (8)	Semi structured interviews (10)
2. Organizational issues for involving consumers	Case studies (8)	Semi structured interviews (10)
3. Crowdsourcing as consumer involvement technique	Case studies (8)	Semi structured interviews (10)
4. Opportunities and challenges of innovation communities	Expert interviews (4)	Semi structured interviews (4)

For the first three research questions, a different research sample is used than for the fourth research question. Previous chapter described the variables and relationships which are analyzed for each research question. The first three research questions focus on empirical data analysis of eight case studies and to validate the assumed relations between the variables. In order to generalize these empirical results, a representative sample needs to be selected. Based on the results of these case studies, four additional interviews with experts are conducted. Due to the limited cases that used crowdsourcing as consumer involvement technique, the relations of this variable with other variables are researched by expert interviews. These four interviews with experts are not used to generalize the outcomes of the interviews, but to validate the results of a part of a specific variable, the consumer involvement technique crowdsourcing and to explore opportunities of this specific technique.

The first research question focuses on consumer involvement in the Dutch food industry. There is no data available containing the number of innovation in the Dutch food industry, thus in order to select a representative sample of the population, a heterogenic sample is selected. Several academic articles review a certain number of product innovations, for example Enzing (2009) who screened 129 product innovations, however no data is provided about the total number of product innovations in the Dutch food industry. The Centraal Bureau voor de Statistiek (CBS) publishes also several data about innovations of companies in the Netherlands. Between 2006 and 2008, 14.152 companies were developing or had already, successfully or not, launched an innovation. However, this are only technological innovations. No technological innovations are not included. 73% of these innovations was a product innovation (CBS: bedrijven met innovaties, kerncijfers). In 2006, 746.365 companies were operating in the Netherlands, from which were 4.500 operating in the Food and Beverages industry (CBS: historische economische demografie). Using the percentage of Franke of Shah (2003) who state that 14,5 percent of the innovations were viewed by users as completely new,

this results in 8,5 technological radical product innovations in the Dutch food industry. As is assumed that the number of radical products is higher, a heterogenic sample of companies is selected to conduct a representative sample. Companies with different characteristics are thus selected. Both small and large companies are selected, both companies operating in the business to business and business to consumer segment, both start-ups and established companies and both technology- and market driven companies are selected. These variables are selected as is assumed, based on literature described in previous chapter, that these influence the consumer involvement process. The selection of these companies is however not performed randomly. This is due to the difficulty to find real radical product innovations. In the third paragraph of this chapter, the selection of these cases is described and in the seventh paragraph the measures which are taken to increase the validity and reliability of this study.

The third research question focuses specifically on the consumer involvement technique crowdsourcing. Only one company conducted consumer involvement with the use of this method. Based on these results, no relations could be found between the variable crowdsourcing (as part of the variable consumer involvement technique) and other variables. Several interviewees however, recognized both opportunities and challenges for involving consumers through crowdsourcing. In order to validate the results of the third research question and to explore the relations with other variables, four additional interviews with experts are conducted. The research sample for these interviews is selected based on a nonprobability sample method: convenience sampling. This is often used in exploratory research to get a gross estimate of the results. Since the lack of literature on this specific topic, the exploratory character of this method is in accordance with the goal of the question, and is thus not representative for the entire population. By conducting four interviews with different facilitators of research communities, a clear exploration of the topic is conducted. In paragraph 3.3 the selection of the experts is argued.

3.2 Research method

As can be seen in the figure above, the research methods case studies and expert studies are used to collect data for this research. These are performed through semi-structured interviews. Qualitative research is conducted to answer to answer the research questions. As it is hard to determine and to select a representative sample of the population, quantitative research for this thesis would have been very difficult.

This study aims to describe current practices of companies, but also to explore the rationale behind. As there is no extensive research conducted yet on involving consumers through crowdsourcing supporting radical product innovation, not many theories are available to build this research on. In the field of new topic areas, case study research is, according to Eisenhardt (1989), especially appropriate.

In order to build a valuable methodology design, the work of Eisenhardt (1989) is used. Ravenswood (2011) concludes that the article of Eisenhardt (1989) is still very important in terms of the replication, validity, usefulness, and surprise values of her findings. Eisenhardt (1989) built a framework consisting of eight steps for executing case studies. This framework is presented in appendix A. Only the relevant steps for this research are outlined in the next section.

Two interesting definitions of case study design are formulated by Babbie and Eisenhardt. Babbie (2007, p. 298) defines a case study as *“the in-depth examination of a single instance of some social phenomenon”*. Eisenhardt (1989, p. 534) defines it as: *“a research strategy which focuses on understanding the dynamics present within single settings”*. These definitions give a sufficient understanding of the research method.

The final research question is researched with the use of expert studies. The eight case studies from the first three research questions are companies who developed a new product. The four experts for

the final research question are third parties who offer a platform to companies for involving consumers through crowdsourcing. These four platforms are analyzed through expert interviews with managers of those platforms.

Building theory from case study research

Getting Started

According to Eisenhardt (1989), it is important to start with a definition of the research question and with a well-defined focus. A specification of the constructs help to shape the initial design of theory building research and constructs can be measured more accurately. This is done in the first chapter of this research. During the research, the research questions and focus may shift. As was stated in previous chapter, no hypotheses were formulated. This is because Eisenhardt (1989) stated that you need to begin as close as possible to the ideal of no theory under consideration and no hypotheses to test. Preordained theoretical perspectives or propositions may bias and limit the findings. According to Eisenhardt (1989), researchers can specify some potential important variables, with some reference to extant literature; however they should avoid thinking about specific relationships between variables and theories as much as possible, especially at the outset of the process. Variables are not specified in this chapter, as there are more potential variables than cases. In the following chapter relevant variables are described.

Selecting Cases

According to Eisenhardt (1989), random selection is neither necessary, nor even preferably. Pettigrew (1988) states that given the limited number of cases which can usually be studied, it makes sense to choose cases such as extreme situation and polar types in which the process of interest is 'transparently observable'. Thus the goal of theoretical sampling is to choose cases which are likely to replicate or extend the emergent theory. This is done by choosing very different cases. Radical innovations in the business to business segment are chosen, but also start-ups and large companies. It is however difficult to select polar types based on successfulness. It is difficult to determine the success of the cases as they are all in different phases, have different goals and objectives and measure success differently. This means that it is difficult to build theories of success and failure.

Analyzing data

Within-Case Data

This step is a difficult one in the process of building theory. Miles and Huberman (1984, p. 16) wrote: "*one cannot ordinarily follow how a researcher got from 3600 pages of field notes to the final conclusions, sprinkled with vivid quotes though they may be*". However, Eisenhardt (1989) identified some key features of analysis. Within-Case analysis typically involves detailed case study write ups for each site. There are probably as many approaches as researchers; however the overall idea is to become intimately familiar with each case as a standalone entity. This process allows the unique patterns of each case to emerge before investigators push to generalize patterns across cases.

Searching for Cross-Case Patterns

The tactics here are driven by the reality that people are notoriously poor processors of information. So you have to look at data in many divergent ways (Eisenhardt, 1989). One tactic is to select categories or dimensions and then to look for within group similarities coupled with intergroup differences. A second tactic is to select pairs of cases and then to list the similarities and differences between each pair. A third strategy is to divide the data by data source. Overall the idea behind these cross-case searching tactics is to force investigators to go initial impressions, especially through the use of structured and diverse lenses on the data. (Eisenhardt, 1989)
Paragraph 3.5 describes the tactics used in this research.

Enfolding literature

It is important to compare the emergent concepts, theory or hypotheses with the extant literature as ignoring conflicting findings will reduce confidence in the findings (Eisenhardt, 1989). According to Eisenhardt(1989), tying the emergent theory to existing literature enhances the internal validity, generalizability and theoretical level of theory building from case study research. This is done in the final part of chapter four and five.

3.3 *Selecting Cases*

3.3.1 Case studies

In order to select new radical product innovation cases compared with the work of Janssen (2011), product innovations were viewed from 2008. These product innovations had to be or technological new, and/or fulfill a latent consumer need. Another criterion was that the products should have been launched already. In order to find these cases, extensive online research was combined with different interviews. First of all, an extensive search on the internet was performed to search for radical product innovations. Most publication however by media regarding the introduction of new products in supermarkets, are relatively negative about the number of successful product introductions. An analysis was performed on the top 20 most successful supermarket introductions from 2008 to 2012. Regarding the number of innovations, 2007 was a good year. Introductions as Coca-Cola Zero, Chocomel Hot and Campina Optimel scored very high on turnover; however, these were all incremental innovations. From 2008, the financial crisis hit the Netherlands and this was visible in the number of innovations. The year 2009 showed the impact of the financial crisis, but also the lack of radical introductions from manufacturers and conservative supermarkets. To compare, only three innovations achieved more than a weakly turnover of 100.000, two years earlier this was thirteen innovations. Most important for this research is the lack of radical product innovations. SymphonyIRI (2010): *“Manufacturers are less innovative, supermarkets provide more space for their own brands and the consumer buys less merrily and more conservative”*. And *“also product introductions in 2012 suffered from the crisis and the trend of managing the existing assortment instead of introducing spectacular new products”* (Intro top 20, 2012). No radical innovations were found in the top 20 introductions in the last five year.

This analysis was followed by more research online and with several interviews with experts in different fields. Lists of innovative companies in the Netherlands were analyzed and innovation contests, such as ‘MKB Innovation Top 100’ were discussed. These interviews were performed with the objective to find radical product innovations and to discuss them. Interviews were conducted with:

- Kees de Gooijer, from the Nuttrition Delta.
- Karen Janssen, author of the dissertation “Driving the food market”
- Frans van Bommel, market researcher at Douwe Egberts
- Gerard Kroes, market researcher at Douwe Egberts
- Johan Sanders, Research and Development at Douwe Egberts
- Several marketing employees at Douwe Egberts

Finally, a list of ten radical product innovations was created. This list included one product which was launched before 2008, but as this innovation was not researched by Janssen, it could be included in this thesis. One product was not launched yet. However, as this product was already tested in a pilot and completely developed, it was also included in the research. These ten companies were contacted and asked to participate in the study. One company representative did not have time and one other company did not want to tell about the innovation due to confidentiality issues. This resulted in a list of eight radical product innovations in the Dutch food industry which were included in the research. This list is showed in figure 3.2. Figure 3.3 shows the details of the conducted interviews.

Figure 3.2: Selected cases

Number	Company	Product innovation	Year of innovation introduction
1	DEMB 1753	Senseo Sarista	2012
2	Bols	Bols Foam	2011
3	Mongozo	Premium Pilsener	2010
4	Yuno	Wackowaves Chips	2011
5	OJAH	Beeter	2010
6	Proviand	Proviand	Not yet
7	Eve's Choice	Eve's Choice	2012
8	AVEBE	Etenia	2007

Figure 3.3: Conducted case interviews

Interview	Innovation	Interviewee	Function	Date	Length
1.	Eve's Choice	Vincent Melman	Founder	15-11-2012	72 min
2.	Etenia	Piet Buwalda	Technological manager	19-11-2012	28 min
3.	Wackowaves chips	Tom Vogel	Founder	21-11-2012	55 min
4.	Senseo Sarista	Bram Meijer	Product Group manager	21-11-2012	40 min
5.	Senseo Sarista	Joost Knittel	R&D manager	23-11-2012	70 min
6.	Senseo Sarista	Dries van Hassel	International Panel Coördinator	31-01-2013	23 min
7.	Mongozo Premium Pilsener	Jan Fleurkens	Founder	26-11-2012	32 min
8.	Beeter	Jeroen Willemsen	Commercial director	27-11-2012	63 min
9.	Proviand	Menco Sandstra	Managing director	27-11-2012	69 min
10.	Bols foam	Hanneke de Bruin	Commercial manager	28-11-2012	30 min

As described in the research design, the research sample contains companies with a heterogenic set of characteristics. Figure 3.4 shows the characteristics of the company on four variables.

Figure 3.4: Characteristics of the case companies

Company	Small versus large	Founded for that innovation	Technology versus market driven	BtoB versus BtoC
DEMB 1753	Large	No	Market	Both
Yuno	Small	Yes	Market	Both
AVEBE	Large	No	Technology	Business to Business
Ojah	Small	Yes	Technology	Business to Business
Proviand	Small	Yes	Technology	Business to Business
Eve's Choice	Small	Yes	Market	Business to consumers
Bols	Small	No	Technology	Business to Business
Mongozo	Small	No	Market	Business to consumers

This figure shows the diversity of the eight involved companies. Based on this heterogeneity can be concluded that this set of companies represents the population of companies in the Dutch food industry.

3.3.2 Expert interviews

The interviewees are selected based on the results of the third research question. These results show that not many companies conduct consumer involvement via crowdsourcing. To validate these results, four interviews are conducted with experts in the field of crowdsourcing. For these

interviews, a heterogenic group of experts is selected with all experience in the field of crowdsourcing. All interviewees work on a daily base with innovation communities and have experience with these communities at different companies. Company representatives as experts would have yielded different information, only relevant for that specific company. Involving facilitators of innovation communities in this research yields more data for exploratory research.

The interviewees are selected based on their applicability for this research. As the objective of the fourth research question is to explore the relations crowdsourcing has with other variables, the interviewees are selected based on the different variables.

Two companies facilitate and manage innovation communities for companies and another company facilitates a platform for radical product innovation. The fourth interviewee advises companies how to conduct consumer involvements and writes books about crowdsourcing and co-creation. The companies were recommended by different managers and after several orientating e-mails and telephone calls, four interviews were conducted. Figure 3.5 shows all the conducted interviews.

The first interview, with Insites Consulting, was conducted because this company has much experience in setting up and managing innovation communities for large companies. In the orientating phase before the interview, the interviewee stated that crowdsourcing offered enough opportunities for radical product innovations. For this reason and the experience in managing innovation communities, this company was selected.

Insites Consulting is a market research agency with its core still in market research (who we are, Insites Consulting). Their leading method is to bring customers 'in the boardroom', customer consulting boards, also known as Research communities. The interviewee focuses on qualitative methods linked to co-creation and innovation communities; tools for getting organizations closer to consumers in an open creative setting.

The second company, Food Connection Point, was selected based on two interviews from the case studies. The respondents of two small companies stated that a platform especially for small companies for involving consumers in the food industry would be very interesting. Such a platform should be organized by an organization to connect small companies with consumers. After an extensive search, such a platform was found and selected for this thesis.

Food Connection Point (FCP) is a network organization for and by food-entrepreneurs, the government and education to strengthen the position of food-organizations in the south of the Netherlands. At the moment, sixty companies are connected and are working together to search for opportunities, mainly in the area of innovations. Jacqueline Lanting is working as a consultant for FCP. One of the projects which is started by FCP is Food to market. This is a project whereby FCP is helping companies to launch their food product, by organizing trainings, workshops and developing tools. One of these tools to help companies is the Food Challenge 2020. The Food Challenge 2020 is a platform on Facebook where consumers are asked to upload ideas about the future of food. Five different challenges are developed, from which three are finished. For the first challenge, consumers were asked 'How does the food look like in 2020?', the second challenge concerned 'Food & Sustainability', the third 'Food & Design', the fourth will be 'Food & Health' and the final is not defined yet, but will be more specific for a certain company.

The third platform was selected based on recommendations of other research agencies. Also this company had experience in organizing and facilitating innovation communities for companies, but mostly for small and medium sized companies. This complements the first company.

WOID, 'Woensdag Open Innovatie Dag', is an advise agency by Detlef la Grand. Since a few years innovation processes at companies have changed due to the emergence of social media, cloud tools and mobile devices. Also the way companies innovate is innovating. WOID advises companies to turn processes, products and services digital, gives workshops about social media, cloud tools and mobile

possibilities, and develops tools and web applications for the new networked world (WOID, n.d.). WOID advises companies from twenty until hundred and fifty employees.

The fourth interview was conducted with Sjors van Leeuwen, author of the book 'Klant in de driver's seat' and director of the company Indora Managementadvies. Van Leeuwen is already more than twenty years active on the intersection of marketing, organization and ICT. Indora advises and accompanies companies in drafting and executing strategies in the field of customer-oriented business, CRM, internet, marketing and strategy. This interview was selected based on the book 'Klant in de driver's seat', which was written by van Leeuwen. In this book van Leeuwen describes why co-creation and crowdsourcing often fail.

The research sample of the four interviewees is as stated before, not randomly chosen, but selected based on their applicability for this study. This research sample is thus not representative for the population, however it yields an exploratory insight in the world of crowdsourcing and radical product innovation.

Figure 3.5: Conducted expert interviews

Interview	Company	Interviewee	Function	Date	Length
1.	Insites Consulting	Thomas Troch	Research Innovator	16-11-2012	53 min
2.	Food Connection Point	Jacqueline Lanting	Independent Food Consultant	14-12-2012	50 min
3.	WOID	Detlef la Grand	Founder	04-02-2013	57 min
4.	Indora Managementadvies	Sjors van Leeuwen	Director	27-03-2013	50 min

3.4 Interview protocol

Case studies

In order to structure the qualitative interviews, an interview protocol is developed. As this research is not quantitative, no questionnaire is developed, but a protocol to give direction to the interview. Qualitative interviews are based on a set of topics to be discussed in depth, rather than based on the use of standardized questions. According to Rubin and Rubin (1995, p. 46-47), qualitative interviewing design is flexible, iterative and continuous. Each time you repeat the basic process of gathering information, analyzing it, winnowing it and testing it, you come closer to a clear and convincing model of the phenomenon you are studying. The continuous nature of qualitative interviewing means that the questioning is re-designed throughout the project.

This flexibility gives the researcher space to go in depth for special points of interest which could increase the internal validity of the results. However, this can also lead to a bias and a construct validity threat. This form of interviewing is more subjective than questionnaires because of the own interpretation of data by the researcher, caused by the opinion and experiences of the interviewer (Babbie, 2007). The interview makes use of both open- and closed questions. Closed questions are used to classify the used technique and characteristics of the case in the framework of Janssen (2011). Open questions are used to ask for the rationale behind and for other questions. The interview protocol is placed in appendix B; the themes as discussed in previous chapter are visualized in the italicized words.

All the interviews have the same structure. They start with an introduction of the person and the company. Hereafter, questions about the product innovation are asked and the consumer involvement, if present, is analyzed. This is being followed by questions about the characteristics of this involvement, referring to the four dimensions as discussed earlier plus the innovation in which consumers were involved. Hereafter, the sharing of innovations and knowledge by the company is

discussed and the role of the facilitator. The interview ends with a look into the future regarding crowdsourcing and consumer involvement for radical product innovations.

Expert studies

Also for the expert studies an interview protocol is developed. However, as these interviews are used to explore the potential of crowdsourcing, and not to validate already found results, only open questions are used in this design. Figure C in the appendix shows this interview protocol. Also this protocol starts with an introduction of the person and the company. Hereafter questions about innovation communities are asked and how they can be used for supporting radical product innovations. These include two dimensions from the framework of Janssen (2011), the phase in the innovation process and interesting topics which were mentioned in the case studies by respondents; such as the role of the company representative and the type and size of companies. Hereafter the critical question is asked to what extent crowdsourcing can really yield radical product innovations. The protocol finishes with questions about sharing of innovations and social media, which was also mentioned by interviewees in the case studies.

3.5 Data collection

The data collection in this thesis can be divided into three phases, the before -, during -, and after part.

Case studies

Before all case interviews were conducted, the cases were studied with the use of available material online and discussed with experts, as stated in paragraph 3.3. Each company website was extensively studied, but especially information about the product innovation was analyzed. Both articles from the company itself, as objective articles about the introduction from third parties were analyzed. Before the selection of the cases, many news articles and reports were read and discussed to assess the radicalness of the introduction.

During the interviews, the interview protocol was the guidance in the conversation. In all cases, the interview protocol was followed, added with additional questions based on previous interviews or new insights. During the interviews, notes were taken to write down ideas, interpretations and thoughts. To increase the reliability and validity, all interviews were recorded with the use of a voice recorder. The interviews were performed on different locations. Six interviews were performed at the company of the interviewee, two at a meeting room in a hotel and two interviews were performed on the phone. In one case the interviewee did not have time to meet and the other interview was performed on the phone because the interviewee was abroad.

After the interviews, the transcript of the interview was made within two days to avoid misinterpretation and sent for review to all interviewees. Two of the ten interviewees suggested small textual changes which were agreed and changed in the transcripts.

As can be seen in figure 3.3, ten interviews were conducted to analyze eight cases. The only innovation which was analyzed by more than one interview was the Senseo Sarista which was introduced by D.E. Master Blenders 1753. This was conducted because consumers were in this case involved via a crowdsourcing method. In order to analyze this method, two additional interviews were performed. The seven other cases did not involve consumers through crowdsourcing. The validation of these seven interviews was performed through the sending of the transcript to the interviewees for control and validating the outcomes with the available information online and offline. Due to the heterogeneity of the different cases, the external validity of this sample is high. In order to increase the reliability and validity of the interview results, several measures were taken.

These are described in the seventh paragraph. These measures secure the validity and reliability of this research.

Expert studies

Before the four interviews were conducted, online information was studied about the companies and the projects they had organized. One interviewee sent information about the platform and the several projects that company had conducted prior to the interview. This was information about previous conducted involvements with consumers. Much information was available about two companies. For the third company not much information could be obtained prior to the interview due to the lack of information online. Interesting phrases from a book functioned as background information for the fourth interview.

All the expert interviews were performed by telephone for practical reasons. Also these interviews were recorded with the use of a recorder and issued within two days.

3.6 Qualitative data analysis

After the interviews, the process of data analysis started. As was stated before, the interviews were immediately transformed into analyzable data through transcribing them into written text.

In analysis of case studies, there are inevitably more variables than cases, or data points, so traditional statistical analysis cannot be applied. Therefore, different techniques need to be used to organize and systematically review large amounts of information (Kohn, 1997).

According to Yin (1994), data analysis consists of examining, categorizing, tabulating, or otherwise recombining the evidence to address the initial propositions of a study. Every investigation should have a general analytic strategy and Yin (1994) presented three analytic techniques: pattern-matching, explanation-building and time-series analysis. Explanation-building is most useful in explanatory case studies and is a technique that is fraught with problems for the investigator, for example loss of focus (Yin, 1994). Time-series analysis is most used in experimental and quasi-experimental analysis. According to Trochim (1989), pattern-matching is one of the most desirable strategies for analysis. This technique compares an empirically based pattern with a predicted one. If the patterns match, the internal reliability of the study is enhanced. Eisenhardt (1989) states that multiple data analysis methods contribute to the flexibility and validity of the results. Eisenhardt (1989) applies this for cross-case patterns. First look at within-case data and then search for cross-case patterns.

This technique was applied with the use of three coding methods. At first, open coding was used to find categories. The goal was to develop categories out of the raw data. This was done with the use of memo's which were made during the interviews and coding the transcripts of the interviews. With the use of a marker the data was analyzed. The use of a clear interview protocol during the interviews helped in this process. After all the interviews were analyzed and marked, the colors were put together to create categories. This process ended when saturation occurred. From this could be concluded that the cases differed highly from each other regarding the existence of categories. Not in each case, the same categories were found.

The second step was to find relationships between those categories; axial coding. The four dimensions of Janssen (2011) indicated the first relationships between categories, but also the lack of relationships between categories. Some categories were found almost completely not connected with other categories and others were found highly interconnected. After new information did not provided new insights, this phase was stopped.

The final step in the process of coding was selective coding to relate results. Strauss and Corbin (1990) define this step as '*selecting the core category, systematically relating it to other categories, and filling in categories that need further refinement and development*'. After the core category was

found, this was the category connected with all other categories, the relationships in and between categories could be explained. This core category is intensively described in the next chapter.

3.7 *Validity and Reliability*

Two important characteristics of a research are its reliability and its validity. Through different methods and techniques applied in this study, the reliability and validity of this study are tried to secure.

According to Babbie (2007), the form of using an interview protocol is more subjective than questionnaires. The opinion and experiences of the interviewer can have influence the interpretation of data by the researcher. This can both influence the validity and reliability of the research. However, the interview protocol also has positive effects on the reliability of the study. Reliability is defined by Babbie (2007, p. 143) as *“that quality of measurement method that suggests that the same data would have been collected each time in repeated observations of the same phenomenon”*. The interview protocol increases the reliability by structuring the interview in some extent to build in consistency and quality control; but it also offers flexibility to capture the local story. The interview protocol was created for this study, but also used in each interview. As stated before, the interview protocol functioned as guidance in all the interviews and influenced the coding of the transcripts much easier. Another method which was used to increase the reliability was to provide interviewees the ability to make corrections in the transcripts when needed. After the transcripts were made, these were sent to the interviewees. Two interviewees suggested small textual changes.

Validity is a term describing a measure that accurately reflects the concept it is intended to measure (Babbie, 2007, p. 146). According to Babbie (2007, p. 313), field research seems to provide measures with greater validity than do survey and experimental measurements. Often used classification is the one provided by Shadish, Cook and Cambell (2002). They distinguish statistical conclusion -, internal -, external -, and construct validity. Statistical validity is not relevant for this thesis.

Internal validity is a concern for analysis of single and multiple cases (Kohn, 1997). Internal validity concerns the question whether the causal relationship between two factors is not affected by a third factor (Shadish, Cook and Cambell, 2002, p. 54). The strengths of open interviews contribute to the internal validity of the research. Asking for the rationale behind can provide perceived causal inferences. As is showed in the next chapter, the one case which is most important due to its consumer involvement is analyzed most intensively. The internal validity is increased by having three different interviews with three different employees to research the rationale behind the made choices. In previous paragraph is being explained why in other cases no other interviews were held. This limits the threat of internal validity in this study.

External validity is a concern for only multiple cases. According to Yin (1994), external validity in case studies refers to the ability to generalize results to some broader theory. This can be achieved through the replication method, which is used in this study. If results are replicated in multiple cases, the findings are considered more robust (Kohn, 1997). Using multiple cases improves external validity; however, it can also exacerbate problems of data overload. Data overload is a threat for both validity and reliability. Another issue is the composition of the cases. The greater the heterogeneity among the cases, how higher the external validity. However, homogeneity among cases enhances internal validity and facilitates replication. This study contains a rich heterogeneity of cases which enhances the external validity. Not only small and large companies are selected, but also companies working in the business to business segment. The threat of data overload is limited by analyzing the interviews immediately afterwards and selecting the most relevant categories from the transcripts. By using multiple and heterogenic cases, the external validity of this study is increased.

Finally, construct validity refers to understanding constructs and assessing them (Shadish, Cook and Cambell, 2002, p. 65). Construct validity can be a major threat for case study design. The interview can be biased by poor questions, the response, incomplete recollection and reflexivity; when the interviewee expresses what the interviewer wants to hear. Following Kohn (1997), Elite Bias and Going native are also potential biases. Elite bias is the risk of giving greater weight to high status or more articulate informants. Going native refers to the risk of being co-opted by respondents so that the researcher loses objectivity and distance. Construct validity is reduced in this research to clearly explain all definitions, questions, record all interviews, stay objective and to keep distance from all interviewees. The threat of poor questions is limited by discussing the questions with experts beforehand, as explained in paragraph 3.3. Also the work of Janssen (2011) is used to develop the interview protocol. As this research is not conducted as assignment for a company, but only for the University, the risk of going native, elite bias and incomplete recollection and reflexivity is decreased. Elite bias is also reduced by the use of transcripts and the process of coding.

4.0 Empirical results

In November, December, January and March ten interviews were conducted to answer the first three research questions and four other interviews to answer the fourth research question. In this chapter the assumed relationships between variables, as visualized in the conceptual model, are validated or invalidated. This is performed through an in-depth description of the interviews. The first part covers the first ten interviews, the second part describes the four expert interviews. The analysis is based on the data analysis method as described in previous chapter.

4.1 Case studies

DEMB 1753

Douwe Egberts Master Blenders 1753 is a coffee and tea company which recently went public in the Netherlands and divided from its American mother company. D.E introduced in 2001 the famous Senseo which transformed the entire coffee industry and is in terms of turnover, still the best introduction in the 21st century. In cooperation with Philips, DEMB 1753 developed a new coffee system consisting of a fully automatic coffee machine that uses bean-funnels filled with freshly roasted coffee beans, called the Senseo Sarista. The method to drink coffee through bean-funnels is completely new, the variation in beans is also new and the ability to choose between multiserve and singleserve is also new in the beans category.

Yuno

Yuno was founded by two parents who were frustrated by the current unhealthy offer of snacks for children. For this reason, they developed two healthy snacks especially for children: WackoWaves vegetable chips and FreakyFruits fruitcandy. The products are free from artificial additions and contain considerable less fat, added sugar and calories. The chips are made from vegetables instead of potato starch and are 100% natural. Also no E-numbers are included in the product. This innovation won in 2010 the award for most innovative start-up in the area of healthy food.

AVEBE

AVEBE is an innovative company that researches and sells solutions based on starch for several industries. In 2007, a real technological innovation was launched by AVEBE, called Etenia. This is a new starch which is made with an enzyme which is heat resistant and can modify starch. Together with the two basic components of starch, this results in starch that has strong gelling properties which can replace fat and gelatin in several applications, like dairy, bakery products and sweets. Products can now have the same taste and texture with the addition of Etenia, while there is less fat present.

Ojah

Ojah serves the business to business market and launched Beeter in 2010 which is called 'the most versatile alternative for fish or meat'. More and more consumers want to eat less meat, however the existing products did not fulfill that need. Beeter is an alternative, but it has the taste and structure of meat or fish, and it fits into a healthy diet. Beeter is made of natural ingredients, is gluten-free, 100% plant based, low on fat, protein rich and produced in the Netherlands. Ojah won in 2012 the award for the most innovative small and medium company.

Proviand

Proviand is a product which is not officially launched yet, however a pilot test is conducted already. It is a small company started by a technical invention in 2009. A method was found to create a texture similar to meat, but from vegetables. Proviand is also, like Beeter, an alternative for meat, however Proviand is made from vegetables. It has a bite similar to meat, is full of healthy ingredients, it contains no gluten and e-numbers, and is low on fat and salt. Comparing to Beeter, for this product

no soya is used which contributes to the sustainability. Proviand also aims to source 100% of their products locally, which is almost achieved.

Eve's Choice

Eve's Choice was founded in 2010 and that year the company won the new venture award with the business idea to develop an innovative new cookie. A healthy and sustainable snack for women was developed which contained 25% less sugar than comparing products like Sultana. The base ingredient is barley, instead of wheat which is normally used. Other features of the product are the package which is resealable and the partible cookie which counters overconsumption, as consumers do not need to eat the entire cookie at once.

Bols

The company located in Amsterdam founded by Lucal Bols and specialized in liquors, launched in 2011 a radical innovation called Bols Foam. Bols was searching for something to boost their liqueurs and to create fun with cocktails. An inventor from England came to them and told them that he had found something interesting: foaming alcohol. Together they developed the product and in 2011 the product was launched. It is the first and only liqueur foam in the world and contains a natural ingredient which is added to make the liqueur foam able.

Mongozo

Mongozo is a Dutch company with its factory in Belgium. Mongozo developed a beer which is completely gluten-free, fair trade and biologic; and this combination is unique. The most difficult part in the process is to retrieve gluten from the barley malt. The beer is especially for consumers who are not allowed to eat/drink gluten. The product Mongozo Premium Pilsener won in 2012 the award for the best gluten-free beer in the world.

Characteristics

Table 4.1 shows four characteristics of the eight cases. The eight cases are categorized based on (1) their size, (2) if the company was founded to commercialize that specific innovation, (3) if the innovation was technology – or market driven, and (4) if the company operates in a business to business environment or business to consumer environment. These characteristics are selected as the companies differ greatly on these characteristics.

A company is categorized as a large company, as it has more than 50 employees. A company is founded for that innovation as the innovation described above was their first product. Other companies existed already and did have other products. The distinction between technology – and market driven is based on the outside-in versus inside-out perspective. Taking into account that almost no pure technology-driven and market-driven companies exist anymore, companies try to gain advantages of both strategies; the selection is made on the route to market of the innovation. Market driven innovations started with business ideas focusing on market opportunities. The product was developed hereafter. Technology driven innovations started mainly by technological inventions by the companies and the application was found afterwards.

Table 4.1: Characteristics of the company

Company	Small versus large	Founded for that innovation	Technology versus market driven	BtoB versus BtoC
DEMB 1753	Large	No	Market	Both
Yuno	Small	Yes	Market	Both
AVEBE	Large	No	Technology	Business to Business
Ojah	Small	Yes	Technology	Business to Business
Proviand	Small	Yes	Technology	Business to Business
Eve's Choice	Small	Yes	Market	Business to consumers

Bols	Small	No	Technology	Business to Business
Mongozo	Small	No	Market	Business to consumers

4.2 Consumer involvement in the Dutch food industry

This paragraph describes the results of the ten interviews with representatives of the eight cases and is divided in three parts. Each part focuses on one research question. In the conclusions the research questions are answered. In the subparagraphs, the different categories are described which were found in the analysis of the interviews. From the analysis can be concluded that the phase in which consumers are involved, is related to all other categories and is thus defined as core category. The relations between the core category and the other categories are described in the conclusions.

4.2.1 Consumer involvement techniques

The first research question concerns the method companies used to involve consumers in the innovation process. Did the eight companies proactively involve consumers at all is the first question. If yes, the used method(s), the consumers who were involved and in which innovation phase it happened are described. Also the stimulus, interaction and outcome of the involvement are described. The assumed relations between these are visualized in the conceptual model. One dimension needs further explanation. As was stated before, consumers are analyzed on the scale of Rogers (2003) and assessed if they are lead users. However, as companies did not choose consumers based on these variables, another classification is used. The classification of Constantinides and Fountain (2007) is used between amateur innovators and professional innovators. This can be applied to all cases. From the analysis is concluded that the consumer involvement technique is the core category in all interviews. All variables and other categories are related to the consumer involvement technique.

Table 4.2 shows the results of the consumer involvement techniques and the interpretation of the different variables by the different companies. In the left column the variables relevant for the first research question are listed. The eight companies are showed at the right. The table should be read top down. For example, DEMB 1753 involved consumers in both the discovery and incubation phase. In the incubation phase they used in-home product tests and the stimulus in that involvement was product driven and familiar. AVEBE only involved consumers in the commercialization phase with the use of a taste panel. The interaction with consumers was structured, the level of interaction was very low, 'for, the information was derived directly and the outcome of the involvement was experimental.

All classifications are based on data from the ten interviews. For example, during the interview with Yuno, the following data was obtained: *".. So we conducted a professional taste test in Wageningen. This was executed by het Centrum voor Smaakonderzoek. They used a panel of 30-40 diverse consumers. We got an extensive report with scores on bite, crunchy, taste, racy, spicy, salt, sweet and other variables. Our product was also compared with other products"*. Based on this data, there could be concluded that the stimulus was product driven, that the type of interaction was structured and the outcome was experimental.

Table 4.2: Results consumer involvement techniques

	DEMB 1753		AVEBE
Phase	Discovery	Incubation	Commercialization
Technique	(1) Feasibility study (2) Concept test	(1) In-home product tests	(1) Taste Panel
Consumers	Amateurs	Amateurs	Professionals
Stimulus			
Type	Product / Product	Product	Product

Familiarity	Unfamiliar	Familiar	Familiar
Interaction			
Type	Structured / Unstructured	Unstructured	Structured
Level	With / With	For	For
Deriving of info	Directly	Directly	Directly
Outcome			
Type	Feasibility: explorative Concept: experimental	Experimental	Experimental

	Yuno			Bols
Phase	Discovery	Incubation	Commercialization	Incubation
Technique	(1) Concept tests	(1) Product tests	(1) Professional taste panel	(1) Concept test
Consumers	Amateurs	Amateurs	Professionals	Amateurs
Stimulus				
Type	Need	Product	Product	Need
Familiarity	Unfamiliar	Familiar	Familiar	Unfamiliar
Interaction				
Type	Unstructured	Structured	Structured	Structured
Level	With	By	For	With
Deriving of info	Indirectly	Directly	Directly	Directly
Outcome				
Type	Explorative	Experimental	Experimental	Experimental

	Proviand		Eve's Choice	
Phase	Incubation	Commercialization	Discovery	Incubation
Technique	(1) Product tests	(1) Product tests	(1) Concept tests	(1) Concept tests
Consumers	Amateurs	Amateurs	Amateurs	Amateurs
Stimulus				
Type	Product	Product	Need	Need
Familiarity	Familiar	Familiar	Familiar	Familiar
Interaction				
Type	Structured	Structured	Structured	Unstructured
Level	For	For	For	With
Deriving of info	Directly	Directly	Indirectly	Directly
Outcome				
Type	Experimental	Experimental	Explorative	Explorative

The results show that six out of the eight companies proactively involved consumers in their innovation process to develop the product. Only Ojah and Mongozo did not proactively involve consumers. At Mongozo, the development process was too complex for consumers and as the product was not gluten-free during the development; their target group could not test it. For Ojah it was much more valuable to conduct research on consumer experiences after the launch than prior to introduction. According to Ojah, "Most valuable are the reactions of consumers who come to you, who are intrinsically motivated to help you with your product". For the introduction of Beeter, they preferred reactive consumer involvement: "I prefer first introducing the product and then adapting, instead of doing extensive research before the launch and then launching it with the same risk that it is still not good enough".

Proactive consumer involvement

DEMB 1753 involved different consumers at several times in the innovation process and for different purposes. They started with an online feasibility study to search for potential for their new product idea. One research objective was to validate the business case based on trial and price-elasticity data of the current concept. Another objective was to fine tune the concept on selected attributes which were liked or disliked by respondents. Also the concept tests were performed to measure the potential for the product. Consumers were asked what they thought of the concept and if they would buy it. Also a price study was done based on the interest and the willingness to pay a certain amount for the machine. These tests were conducted in a hall whereas the feasibility test was conducted online. Both tests are defined as concept test. Hereafter two in-home product tests were conducted by Philips. Just before the launch of the product, the insiders program was started. Five hundred consumers got a machine and were asked to use it and to write online reviews for generating word of mouth. This involvement was not for product development purposes, but for marketing purposes and it did not contribute to the development of the product. So this is the reason why this is not included in the figure. Mainly the purpose of involving consumers at DEMB is to search for confirmation about the product potential as a tool to convince higher management. *“I cannot remember that we changed something serious because of consumer input. We’re searching for confirmation. All input we got from consumers, was already known”*. An interesting statement supporting the question, should consumers be involved for radical product innovations, is: *“Without consumers the Sarista would have been introduced as well”*.

With the use of a intermediary, Yuno conducted market research about consumer needs. A survey among family, friends and those connections showed the potential for their product. Six different taste tests were conducted with both children and parents and the products were adapted based on consumer input. A final taste test was performed by a professional organization and reviewed the products on different scores. In contrast to the tests at DEMB 1753, consumer involvement yielded surprising results and was evaluated very positive. Outcomes were new insights, confirmation of consumer needs, product potential and improvements of the product.

The only consumer involvement at AVEBE was a professional taste test in the commercialization phase of the product development. The development of the product was very technological, which made the involvement of consumers difficult and unnecessary. The involvement was performed in order to get feedback from the market about several product criteria and potential applications. The results were positive and the involvement was positively evaluated. The answer on the question, how do you evaluate the involvement, was: *“Very well. We used the results from the involvement in presentations to customers to show that with our product, they could produce a product with the same taste as before, but with less fat. It so much healthier”*. So not the actual involvement was considered as very important, but the useful outcomes for sales purposes.

After the technological development of Proviand, consumers were involved to answer questions as: how should we position the product, does it have the right taste, does it have the right structure and the right shape. As the budget was limited, consumers in the close environment were involved to test the product. *“We were really interested in what consumers thought about the product and how they used it. Both on concept level as on product level, consumer insights were very important. However, you need to read between the lines, intuition. If you have a real radical technological innovation, you need to have the guts to state the concept radical as well”*. Even though the involvement is assessed positive, consumer involvement for radical innovations is questioned: *“You need to be radical, not the consumer. For real radical innovations, you need to follow your own thoughts and not the consumer’s. I don’t believe you can create radical innovation through co-creation. Idea generation should be performed intuitive by the entrepreneur. It is important to involve consumers after the development of the product, to make some small corrections. Otherwise you will develop a product*

without the existence of a market. Consumers can be involved for the next flavor, for incremental innovations”.

A company which involved consumers throughout the entire innovation process was Eve’s Choice. In the discovery phase, consumer needs were analyzed by conducting surveys. *“Data from women showed me that they needed smaller portions, divisible and resealable portions and packages”.* Hereafter, interviews were performed with the target group and more useful insights were obtained. The product was developed and marketed based on consumer insights. Consumers were selected carefully: high educated women between fifteen and thirty-five and with certain habits and values. The involvement was evaluated as very positive: *“It was an eye-opener for me. The results at the end were very different from what I expected beforehand. And that’s why I did it. At the start for example, I did not know that the snack habits between men and women were so different”.*

The consumer involvement at Bols was not evaluated that positive and the view on the role of consumers shows that: *“Radical product innovations are mainly technical and do not come from the market. They come from a technical invention or from distributors”.* Bols conducted questionnaires with consumers in their experience center to ask consumers about their willingness to try something new on their drink and what they would think of something floating on their drink. However, as the product was still secret and the patent was not granted, the product could not be mentioned. This did not lead to a successful involvement: *“A limited success, consumers had no idea where we were asking about, so we stopped quite early”.*

Conclusion

The first research question is formulated in the first chapter as: *How do companies in the Dutch food industry involve consumers for supporting radical product innovations?* Based on the conceptual model, this question is answered by analyzing the variables phase, company characteristics, consumer involvement characteristic and consumer involvement technique and their relations.

Phase & company characteristics

- 3/6 companies involved consumers in the discovery phase, 5/6 in the incubation phase and 3/6 in the commercialization phase
- Technology driven companies did not involve consumers in the discovery phase (0/3), twice in the incubation (2/3) and twice in the commercialization (2/3)
- Market driven companies always involved consumers in *both* discovery (3/3) and incubation (3/3) phase, and once in the commercialization phase (1/3)
- Companies founded for the specific innovation, always involved consumers in the incubation phase (3/3), twice in the discovery phase (2/3) and once in the commercialization phase (1/3)
- Companies with already other products in their portfolio, involved consumers twice in the incubation phase (2/3), and both once in the discovery (1/3) and commercialization (1/3) phase
- No relations can be found between the phases in which consumers are involved and the size of the company and if the company operates in a business to business environment or in a business to consumer environment

Consumer involvement technique

- In the discovery phase, companies use concept tests for consumer involvement (4/4)
- In the incubation phase, companies mostly use product tests (3/5) and otherwise concept tests (2/5)
- In the commercialization phase, companies mostly use professional taste panels (2/3)

Consumers

- Companies did not select consumers based on the selection of Rogers (2003) or Urban and von Hippel (1988), but rather on convenience and target group
- Professionals are in 2/3 cases used for professional taste panels in the commercialization phase
- In all other cases, amateurs are used

Stimulus

- Four tests are conducted in the discovery phase, 2/4 are product driven (product tests) and 2/4 are need driven (concepts tests)
- From these four tests, the stimulus is in three cases unfamiliar (3/4) and once familiar (1/4)
- Five tests are conducted in the incubation phase, 3/5 are product driven (product tests) and 2/5 are need driven (concept tests)
- From these five tests, four are familiar (4/5) and one unfamiliar (1/5)
- Three tests are conducted in the commercialization phase, all are product driven (3/3) and familiar to consumers (3/3)

Interaction

- Interaction in the discovery phase equally divided structured (2/4) – unstructured (2/4), the level is mostly with (3/4), once for (1/4), and info is derived both directly (2/4) as indirectly (2/4)
- Interaction in the incubation phase is mostly structured (3/5), level is twice for (2/5), twice with (2/5) and once by (1/5) and information is always derived directly (5/5)
- Interaction in the commercialization phase is always structured (3/3), level is for (3/3) and information is derived directly (3/3)

Outcome

- The outcome in the discovery phase is mostly explorative (3/4) and once experimental (1/4)
- In the incubation phase, the outcome is mostly experimental (4/5) and once explorative (1/5)
- The outcome in the commercialization phase is experimental (3/3)

Based on these outcomes can be concluded that the consumer involvement technique and characteristics are mainly dependent on the phase in which consumers are involved. In the discovery phase, concept tests are used to explore opportunities. The interaction and stimulus differs greatly in this phase. The diversity in this phase is much larger than in the incubation and commercialization phase. In the incubation phase and commercialization phase, most tests are product driven, familiar, structured and information is derived directly. However, in the discovery phase the tests differ more from each other. This can be explained by the high complexity and uncertainty of this phase. Stimuli that are need driven and unfamiliar to consumers focus on latent consumer needs which requires more imagination from both the consumer and company. Also the explorative nature of the discovery phase makes the involvement more difficult, comparing with the experimental nature of the incubation and commercialization phase. How the discovery process is organized depends highly on company characteristics such as founded for innovation and if the company is technology or market driven. The involvement process in the incubation and commercialization phase is more standardized and thus less variable.

The differences between companies that are market- and technology driven are in accordance with earlier found results. Market driven companies involve more often consumers. More interesting is the difference between new companies and established companies. New companies conduct more consumer involvements. The lack of information at newly found companies that introduce a radical new product will probably be the reason for involving consumers. The only innovation which did not involve consumers in the discovery phase at newly found companies, was technology driven. Market

driven companies thus need to involve consumers in the discovery phase for information about consumer's needs.

4.2.2 How is consumer involvement organized

The second research question concerns the manner in which companies organize consumer involvement. Two topics are described in detail: the role of the facilitator and the sharing of innovations. The role of the facilitator describes how the interaction between company and consumer is organized. It can be organized by the company itself or by an external organization, an intermediary. The sharing of innovations describes how companies cope with sharing and protecting confidential information to the outside world. Some companies want to protect their valuable information, for example a technology, other companies believe in an open world where protecting information is not worth it. Results of these two topics are showed in table 4.3. Only the six cases that involved consumers are discussed below.

Role of the intermediary

Table 4.3: Role of the intermediary

Company	Interaction organized by company or external agency?	Why?
DEMB 1753	<i>Online:</i> external agency <i>Concept tests:</i> external agency <i>In-home tests:</i> Philips	Network (Philips), database and expertise (agency)
Yuno	<i>Concept:</i> Yuno <i>Product test:</i> Yuno <i>Professional taste panel:</i> external agency	Internal: budget External: reliability, knowledge and network
AVEBE	<i>Product test:</i> Nizo, Dutch institute for food research	Experience and network of trained panels
Proviand	<i>Product tests (2):</i> Proviand	Budget
Eve's Choice	<i>Concept tests & questionnaires:</i> Eve's Choice	Personal interest
Bols	<i>Concept tests:</i> Bols	Convenience

Janssen (2011) defined three roles a facilitator could adopt: (1) technical set up of the platform and content in community, (2) guarantee confidentiality and (3) bridge for different languages between various actors. These roles however, are more online focused and as five of the six companies did not involve consumers through internet, these roles are not applicable for this research. However, some other interesting roles are found. As can be seen in the table, from the twelve consumer involvements, five are facilitated by an external party. Reasons for using an external agency are the network, expertise, reliability, knowledge and experience of an external agency.

DEMB 1753 stated that they never execute consumer tests by themselves in the development of the innovation. After the launch, involvement with consumers is conducted by marketing and R&D itself, but during the development, the interaction with consumers is outsourced to external agencies. This is mainly done because those agencies have the networks and expertise to conduct those tests.

Yuno conducted the concept and product tests by itself, because of budget reasons. At the start of a small company, there is not enough money to perform an expensive test with consumers. In the commercialization phase, a product test was performed by an external company. This was done because Yuno wanted reliable and valid results on different taste criteria, as this was difficult to obtain from their family and friends, who were involved in the earlier phases. This agency used consumers who were trained in testing products on those criteria.

This was also done by AVEBE. Nizo, a Dutch institute for food research established the interaction with consumers for AVEBE. AVEBE did not have the experience and trained panels to organize a

professional taste test. As the results were used in presentations for customers, the results needed to be reliable.

Proviand organized their product tests by itself. This was mainly done because of budget reasons, as there was no money for expensive consumer involvement tests.

Eve's Choice conducted their product tests and interviews also by itself, but this was mainly because they wanted to: *"Each time you are involved, you learn. Each interaction is different. Probably you can use companies in different phases of the development; they could be of added value. But you always want to do it by yourself"*. Advantage of performing the interviews by yourself is the opportunity to respond to interesting statements of consumers. *"My role was to ask open questions, keep asking why and what consumers were meaning"*.

Bols performed the concept tests by itself, as they asked consumers questions in their own experience centre.

Sharing of innovation

Table 4.4 shows how companies coped with confidentiality issues.

Table 4.4 Sharing of innovations

Company	Protection of product?	Protection during involvement?	Why?
DEMB 1753	Yes, product idea	Yes, confidentiality statements	Product tests were done before anything was released.
Yuno	No	No	Everything in the food sector is open. It is not possible to patent a taste.
AVEBE	Yes, patent	No	We patented everything, so all details are public.
Ojah	Yes, patent	-	We do not show our production facilities and we do not tell everything about the process. Technology is patented.
Proviand	No	No	We did not share it, but it is no secret. Costs a lot of money and time and will extend your time to market.
Eve's Choice	No	No	Everything is duplicable and my product is not only about recipe, but also about feeling, brand and story. You cannot protect that.
Bols	Yes, patent	Yes	Patent was not granted yet and the product was not on the market yet.
Mongozo	Yes, production process	-	Secret how we brew our beer

As can be seen in the table, some companies are protecting their products with patents and some are not. Two out of the six companies who involved consumers protected information during the involvement. The other companies did not.

DEMB 1753 protected its product idea during the consumer involvement by using confidentiality statements. However, *"It is still a risk, there is no guarantee that consumers who know about the product, do not tell the competitor. You can have consumers signed whatever you want, but you will never be sure. Each time you have contact with a consumer; there is a risk for leaking"*. This has been a barrier for DEMB to conduct research. *"If the research is not that crucial and there are high risks, we will not perform the research"*. This is not only a risk outside the organization, but also inside.

“Even intern some things were held secret. No presentations were given about the product for example”. Also the consumers who were involved online had to sign a confidentiality agreement. *“We have had a nasty experience before concerning the leakage of an idea to competitors. A screenshot was taken during an online survey of an idea and send to a competitor. So we created a system where respondents need to push different buttons to see the concept, which makes it impossible to make a screenshot. If something else happens and information is leaked, each screen can be identified”*. According to DEMB 1753, if your speed to market is high enough, it is impossible for competitors to overtake your idea.

Also the risk of leaking was a barrier for Bols. The product was not yet on the market and the patent was not granted yet. However, they wanted to involve consumers. *“So we asked consumers about the concept, not about the product. We could not explain the consumer what we meant, as we were not allowed to tell anything about the product. This limited the interaction with consumers. Consumers did not understand the concept and were of less value for the development”*.

For the other four companies, the risk of leaking was not a barrier for the involvement. An interviewee stated *“We did not share technology-related information during the involvements. But it is an issue if you involve consumers. We did not have to make use of non-disclosure agreements. Leaking can always happen. And protecting costs a lot of time and money and will extent your time to market”*.

Another interviewee stated: *“There were no risks for me. The technological content of the product is not a secret. Today, everything is duplicable. It is impossible for me to protect my product. Instead of 80% barley, others can use 70% of barley and my patent is worth nothing. It is not only about the recipe, but also about the feeling, the brand and the story. That is more difficult to copy”*.

And also another interviewee stated: *“There were no large risks for me. In the food sector everything is open. You cannot protect a taste or a recipe; it is too generic for it. I just don’t tell everything, and hopefully it is difficult for others to copy and we try to build a brand for uniqueness in the market”*. Some interviewees do not believe in confidentiality statements: *“Because if people want to copy, they will do. If you share, you will develop more and better solutions”*. One company patented all their technology: *“So all technology details are public, so there was not really a risk for us”*.

Outlaw community

An outlaw community is described in the theoretical framework, but it also occurred at one case company. After the introduction of the Senseo Sarista, movies of how to hack the coffee machine and the bean-funnel were uploaded on the internet and quickly shared by users. By doing so, consumers can use their own beans instead of the bean-funnels of DEMB. Without social media, the spreading of these movies would not have gone this quick and on this scale. DEMB 1753 states: *“Hackers are offering refillable been funnels and are spreading the word. Through Youtube movies people are showing how to hack the system. This is new and we’re now discussing how to cope with it. In a week this all happened, so very quick. In a few years, everybody will have a 3D printer; with available software you can print your own cover for the bean funnel”*.

Conclusion

The second research question *“In which way do companies organize consumer involvement”*, is answered in this paragraph twofold. Two variables, intermediary and confidentiality, are analyzed and their relation with the phase and company characteristics is researched.

7/12 involvements were organized and performed by the company itself and 5/12 of the involvements were conducted by an external agency. Reasons for using an external agency are the network, the expertise and the reliability, knowledge and experience of an agency. The reason for not using an external agency is mostly budget related. Other arguments are personal interest, convenience and practical reasons.

From the results cannot be concluded that the phase in which consumers are involved influences the number of intermediaries which is involved. In each phase intermediaries are involved. However, the

content depends on the phase in which the intermediary is involved. Intermediaries are involved in the commercialization phase mainly for their experience and reliability, whereas intermediaries are involved in the discovery and incubation phase for their network. This suggests that intermediaries are used as a means in the discovery and incubation phase, and as the end in the commercialization phase. A means to attract consumers and to get them involved, and the end as source of reliability.

The relationship of intermediaries with company characteristics is interesting. All large companies used external agencies for their consumer involvement. One small company involved an external agency for one test. Also established companies make more use of intermediaries than companies founded for the radical product innovation. These differences are mainly budget related. There are no differences between market- and technology driven innovations and companies in the business to business segment and business to consumer segment.

For 2/6 companies the risk of leaking valuable information was that high that it limited the interaction with consumers. For those companies it was a barrier for the involvement. For 4/6 companies this was not the case. This shows the influence this variable can have on the variable interaction, as part of the consumer involvement characteristics.

From these results cannot be concluded that the risk of sharing innovations is dependent on the phase in which companies involve consumers. However, one interviewee in the case studies suggested how further in the phase consumers are involved, the more risk there is in sharing innovations. This statement was also made by one expert in the expert studies, as described in the next paragraph.

Especially companies who are founded to commercialize their radical innovation, view today's world as open and do not believe in the world of protecting everything. This is for them instead an incentive to build a solid brand which is difficult to copy. Three companies patented their products. These are already established firms with other products. The other three company variables do not have a relationship with the variable confidentiality.

4.2.3 Crowdsourcing in the Dutch food industry

To answer the third research question, companies were asked to what extent they involved consumers through crowdsourcing. Crowdsourcing is in this thesis defined as *“a particular way to open up the innovation process, using large networks of individuals to access, capture and explore external knowledge, technologies and competency”* (Oliveira, Ramos & Santos, 2010). Crowdsourcing is a consumer involvement method to involve large groups of individual consumers in the innovation process, mostly performed online. The table below shows the use of crowdsourcing at the eight cases and a short rationale why a company used it or not.

Table 4.3: Crowdsourcing at the eight cases

Company	Crowdsourcing?	How?	Why?
DEMB 1753	Yes	Online feasibility test	Easy method to get into contact with large groups of your potential consumers.
Yuno	No	-	The possibilities now were not present at our start, much more people online now. And budget reasons.
AVEBE	No	-	Product tests cannot be performed online; it is all about the taste.
Ojah	No	-	No proactive consumer involvement
Proviand	No	-	Crowdsourcing is not a tool for proactive consumer involvement for radical innovations, only reactive.
Eve's Choice	No	-	Rather direct face-to-face feedback, important in food industry. Consumers need to feel, smell and taste the product.

Bols	No	-	Crowdsourcing only for incremental product innovations, co-creation projects.
Mongozo	No	-	Too technical, internet used for reactive purposes

The table above shows that only one company used the internet for involving consumers in their innovation process. DEMB 1753 used the internet in order to conduct a feasibility test for their new product. Metrix Lab, a research agency conducted for DEMB 1753 and Philips an online feasibility study to validate the business case of the Senseo Sarista, at that time called Cleopatra, to fine tune the concept and analyze possible attributes.

Purpose of the involvement was to determine and quantify interest and trial for the concept and the likes/dislikes of several attributes. A price study was added to determine the impact of three price levels for appliances and coffee blends. The study was done with consumers from the Netherlands, Belgium and Germany and 3000 consumers completed the survey. This were all coffee drinkers, between 18 and 65 year old, and all were (partly) responsible for buying new coffee appliances. These respondents were selected from an online database managed by an agency.

The online involvement was conducted because it was *“fast, easy for quantification and to analyze the potential of the concept”*. However, it was not conducted to collect radical ideas: *“I don’t think consumers will come up with radical innovations”*. The advantage of online involvement is that you can easily measure your product potential at a large population. This is effectively and can be done very representative. *“You can measure online what’s going on”*. The online involvement with consumers was not to invent radical ideas, but to validate the business case and by doing so to convince higher management of the product potential. *“Evidence of 2000 consumers is much more reliable than your team’s choice for convincing management”*. Employees from research and development and marketing have already a really good idea how the product should look like and how it should work. *“The role of the consumers is to indicate the concept with the most potential”*. The involvement was evaluated as very successful. However, only one of the three involvements at DEMB 1753 was conducted through crowdsourcing. *“Face to face interactions can be interpreted more objectively. People make their own story when sitting behind a computer. By doing research face to face, we are better able to understand all factors which are influencing the consumer”*.

Why did other companies not use crowdsourcing?

Only one out of the six companies who involved proactively consumers used the internet to interact with consumers. The other five companies did not use the phenomenon of crowdsourcing. Different reasons underlie this. Yuno did not use the internet to interact with consumers as four years ago, when Yuno was founded, the opportunities were not as clear as nowadays. *“Interaction with consumers is now much easier and quicker than before. Four years ago, we did not have these opportunities. Facebook was not that large in the Netherlands. More tools and people are online nowadays, including our target groups, mothers but also grant parents”*.

Crowdsourcing was not an appropriate technique for AVEBE to gain the information they needed. The technological development of the product was performed internally. The only interaction with consumers was performed to understand what consumers tasted when eating a product with Etenia and to understand how the product scored on dimensions such as dry, sweet, sour and bitter. According to AVEBE, consumers are not interested in the ingredients or the enzyme; they only assess the taste and texture of the product. *“This cannot be measured online, and for a random consumer assessing the taste and texture is also too difficult. So that’s why we needed specialists”*.

Proviand does not view the internet as a tool to involve consumers for radical product innovations. *“Internet or crowdsourcing is only for reactive involvement purposes. If consumers call us or e-mail us, we respond. Internet for me is a medium to interact with consumers after they bought the product.”*

Internet is highly fragmented, which makes it difficult to gain unity. For involving the consumer, sampling is much more important”.

Also Eve’s Choice did not involve consumers through the internet because *“consumers need to feel, taste and smell a product in the food industry, this cannot be performed online”*. In other segments, the internet can be used more easily to interact about your product, for example the computer industry. Eve’s Choice also states that at the start of the product development, they did not have the knowledge to conduct the involvement online. *“The advantage of face-to-face interviews is the direct feedback you get. If you would have asked Henry Ford about what consumers wanted, he would say, a faster horse. So I am a bit skeptical about market research. A consumer is focused on today’s possibilities. I was searching for new things, new thoughts, than you need consumers who have that fantasy, who can imagine a latent product. This is much more difficult online”*.

Bols uses the internet to interact with their consumers, bartenders who are using the products of Bols, however Bols did not involve consumers in the innovation phase for developing the product. *“Our consumers can be used for co-creation projects, for incremental innovation projects. However, as our consumers are geographically dispersed, it is very difficult to make a product which suits all consumers in the world and to include them in the process. The taste profiles of our consumers are very different.*

As was stated before, Mongozo did not proactively involve consumers in their development process of Mongozo Premium Pilsener. The internet is used for reactive involvement. *“In the past, an e-mail was sent about the content of the product, nowadays, much more questions about our products are sending to us. Blogs are written and questions about how we test our product are being asked”*.

Opportunities & threats

Even though most companies did not involve consumers through crowdsourcing, some companies recognize opportunities for doing so in the future. The R&D manager at DEMB 1753 states that involving the consumer through crowdsourcing in the idea generation phase could improve the product and make the first steps in the process go much quicker. *“This should be done with lead users who are trend sensitive”*. In the incubation phase, the development of the technical product, there is no space for involving consumers. *“It is too technical and too specialized”*.

A threat described by an interviewee, is the opportunity of consumers to give their opinion whenever and wherever about your product. *“This is a risk you have to accept, as we will not go back to four years ago. However, it can have disastrous effects. Products are destroyed on the internet because of some opinions, and those people are not always right. That is what social media can do with your product”*.

Another interviewee stated that crowdsourcing can be very well used for mobilizing consumers and raw data. *“You can start with crowdsourcing to collect thoughts online, raw data, consumer needs and habits, and then select the most appropriate consumers, the ones who are most vocal in their opinions, and then put them together. Show them your product and ask them what do you think about it”*

Two barriers for small companies are the lack of a relevant network and the costs of such a platform. *“You need a platform and that is expensive. You also need companies who can provide you with a relevant network, with the consumers you need. That costs a lot of money and that is not feasible for startups with a low budget”*. A platform for small companies with consumers who like to think about new food projects: *“This would be interesting, both for the relative low costs and the network”*.

Crowdfunding for crowdsourcing

An example of a project what is going to be organized and which could be very interesting, is the ‘crowdfunding for crowdsourcing’ project of Yuno. The new product is not radical, but it shows the potential of crowdsourcing. Yuno did not use crowdsourcing because of the high costs associated with it. However, Yuno is going to use crowdsourcing for their next new product, however, in a new

way. Yuno is going to use crowdfunding, defined by Ordanini et al (2011) as *“the collective effort of individuals who network and pool their money, usually via the internet, to support efforts initiated by other people or organizations”*, to attract money, but mainly to attract consumers who want to be involved in a new product development process.

“Put your money where your mouth is. If you ask consumers what they think of a project, they will answer but not really care. If you ask consumers who invested in a project and who are involved, they care and will think differently. When you invest money in a project, you want people who manage the business with care, but you also want to participate. We want to attract those involved consumers by crowdfunding”. “Already 168 consumers invested in this project and with 25-30 of them and a High School, we will develop three new potential products. These are transformed into prototypes. These prototypes are going to be discussed with all investors online”. “Actually, consumers pay money to test a product and to be involved in a new product development process. Crowdfunding is for us more crowdsourcing, the funding is a nice incidental”.

Both Ojah and Proviand responded enthusiastic about this project. *“If you see it as a marketing tool, that is ok. For innovation, it can work as well, but only if you make a consumer product. “As a marketing tool it is very well suited to generate public relations. If forty thousand people invest in your project, and only five percent of them will like your product on Facebook, it generates a lot of publicity”.*

Online involvement for marketing purposes

An involvement at DEMB which was conducted at the launch of the innovation, was the ambassadors program. Five hundred consumers were involved to become ambassadors of the program.

Consumers received the new coffee machine at home and were asked to write blogs on the internet about the innovation. This was started to spread the word and to generate word of mouth about the new product. *“Internet is really good to interact with your most loyal consumers, you need to listen to them, so you need to invite them and they will like to help you”.*

Everything what was written and said online about the Sarista was measured by DEMB. This was and is an intensive process. *“We measure the sentiment on the internet, who likes the product, who don’t, and why”.* For marketing purposes, consumers were thus very intensively involved. This was not done for contributing to the development, so it is not included in the previous paragraph. However, this case shows how a company can use the increasing online possibilities for launching a new innovation. During the interviews, several interviewees explained how you should cope with the online possibilities nowadays. Interviewees stated: *“don’t be afraid for it, be transparent, communicate open and answer always directly and fair”, “respond quickly, be open for the outside world such as schools and students, and be honest and transparent”, and “be open for consumer thoughts and handle towards it”.*

Conclusion

The third research question of this paper is: *“to what extent do companies use crowdsourcing for radical product innovation?”* From the results of the interviews can be concluded that to a very low extent companies use crowdsourcing for radical product innovation. Only one out of six companies used crowdsourcing as a tool to involve consumers in the innovation process. Online involvement of consumers is performed more often by this company and is experienced as very positive. Online involvement of consumers can be very fast and a large population can be asked in order to determine the product concept with the most potential. The online involvement was not performed to come up with new radical ideas, but to select the attributes with the highest potential, to measure price elasticity and to convince higher management of the product potential. From this can be concluded that companies do not involve consumers through crowdsourcing for creating radical product innovations in the food industry.

Reasons for not using crowdsourcing are: food tests cannot be performed online (2), budget (2), crowdsourcing is only for incremental innovations (2) and possibilities were not available then (1).

From this research question cannot be concluded that the use of the method crowdsourcing is dependent on the innovation phase in which consumers are involved. However, in the next paragraph the relationship between phase and crowdsourcing is showed, as crowdsourcing has different advantages for different innovation phases.

Also cannot be concluded based on these results that company variables influence the use of the consumer involvement technique crowdsourcing. Assumptions about the influence of company characteristics, such as the size of the company and the BtoB or BtoC segment in which the company operates, are discussed during the expert interviews. The results are discussed in the next paragraph.

4.3 Innovation communities for radical product innovation

This paragraph discusses the results of the expert studies, which are described in paragraph 3.3. Four interviews are conducted with representatives from four companies to research the possibilities and opportunities of crowdsourcing for radical product innovation, but also to discuss the problems companies face. In order to validate the results of research question three, the relations between phase and company characteristics on the one hand, and the consumer involvement technique crowdsourcing on the other hand are researched.

4.3.1 Opportunities of innovation communities for radical innovations

This section describes the opportunities of crowdsourcing for companies supporting radical product innovation. An example of crowdsourcing which is used for supporting radical product innovation is described by one interviewee: *“Not all ideas which are uploaded are radical, but there are some real radical ones. Most radical ideas which are uploaded focus on latent consumer needs, ideas about the social meaning of food, like food sharing and using products from your own close environment”*.

According to this interviewee, the added value for companies is the low threshold to get in contact with consumers. *“It is a source of inspiration for companies”*.

The statement that not all ideas from consumers are radical is shared by all interviewees. Also one other interviewee stated that consumers cannot come up with radical ideas, but can help in the process. Consumers are able to show companies different possibilities and applications of a product and business opportunities. *“The combinations of technology and alternative solutions make a product unique”*. The radical part of the process should be performed by the company. *“Many ideas can be generated by consumers, but the chance for the egg of Columbus is very small”*. Not only consumers should be involved, but also experts, suppliers and customers. *“You can view it as an ecosystem. Each discipline is involved which provides a broad context for the company”*. Another point is the combination of offline and online involvement. *“Online can enhance the generation of ideas very well, but the actual development with all disciplines involved, should be performed offline, as you can go much more in depth and respond and switch faster”*. From this can be concluded that the consumer is not the source of radical ideas, but can help companies in the process.

Phase in the innovation process

Results of the six cases show that most companies involve consumers in the incubation phase of the innovation process. However, according to all the expert interviews: *“Consumers should be involved in each phase of the process. Not just a single one. In all phases consumers can be useful”*. Consumer involvement should be a continuous process and online offers enough opportunities.

The first phase, the discovery phase, is the most open and most explorative phase. *“At the start, consumers can help you to identify trends and needs. What does your consumer want in the future”*.

Advantage of involving the consumer right from the start, is that you have a direction where you should go to. *“You can invent 1000 ideas and test them all, or you could involve consumers right from the start, know their thoughts and needs and develop your ideas based on those needs. Real radical innovations are based on consumer insights, on consumer needs”*.

Idea generation can be performed in a community very well. This has the advantage that many ideas can be generated relatively easy and quick. However, this will not yield the most radical ideas. In the incubation phase, consumers can be useful in testing and helping to improve the product. *“You need to put the product in the life of consumers to get to know the product. You need to learn from their experiences because it is such a new product”*. Company representatives need to select the most potential ideas and develop those with only the consumers from the first phase who are suited, which depends on the product.

In the commercialization phase, experiences of consumers can help you to finalize the product. *“It should be a continuously process, but during that process, you need to make decisions based on technological knowledge, not obtained from consumers”*. One interviewee states that the commercialization phase should not be forgotten. Ideas from the crowd how the company could commercialize and distribute the product, which channels should be used, and how the product should be positioned can be very valuable. Creative platforms would be very applicable in this phase.

According to one interviewee, the company can come up with unique ideas, the job of the consumer is to select the ones which are relevant. *“Marketers and R&D will always be able to come up with more and better unique ideas. The difficulty is to invent a relevant unique idea. Especially the nodes of users should be used by companies to test the relevancy of a product”*. This is the opposite of what one other platform is doing. At this platform, consumers are asked to come up with new ideas, and the companies can select the relevant ones.

Certain skills are required to select the most interesting ideas and relevant ideas for the company. *“In the first phase, you need skills to attract the interesting topics from the conversation”*. Related to the fourth chapter, this is indirectly deriving of info. This is also highlighted by another interviewee: *“it is difficult for consumers to be of real added value for companies, but it is possible. As a company, you should be able to select the most relevant aspects of an idea, but that is difficult as well”*.

One interviewee made a clear distinction between crowdsourcing and co-creation. Crowdsourcing is valuable in the discovery phase and co-creation in the incubation phase. Both can be valuable in the commercialization phase. The distinction between retrieving ideas from the crowd in the discovery phase and working closely together in the incubation phase to develop products is similar with the results from the case studies. This interviewee suggests to search in the first phase for radical ideas and to develop these in the co-creation phase. However, in the co-creation phase there may be moments that the company would like to involve more consumers for related problems, so crowdsourcing would be valuable there as well.

Closed or open platform

The openness of a platform is an interesting issue. The platform of one Interviewee’s company is completely open. Facebook is the platform and everyone can upload his or her idea. Facebook was chosen as platform because *“it is a medium where a lot happens and messages are easily spread. It has many users, including our main target group of young adults, and we liked the idea of liking, which was very useful for our platform as the five ideas which were liked most were selected to be judged by an expert”*. This results in an open platform for all consumers. However, *“always certain kinds of consumers participate in such platforms, mostly innovators who are interested in the future of food and like to contribute”*.

Another interviewee uses a different approach. In order to be involved for the platform, you need to be selected. This company only uses closed platforms. Another interviewee suggested that this issue should depend on the phase in which you involve consumers. That interviewee suggested that the platform in the discovery phase should be open for all consumers, as companies want to source general ideas and directions for your product from a large group of consumers. This should be a diverse and heterogenic group of consumers with different ideas. This phase focuses on retrieving information from consumers, whereas the incubation phase focuses on cooperation. The platform

which should be used in the incubation phase is closed, as the company would like to increase interaction between participants in smaller groups.

Type of consumers

One company always involves lead users. *“We do not select the standard users of a product, but innovators and influentials / gatekeepers”*. Two different types of consumers are distinguished. Innovators, who are social, independent and are looking for features of products, they are fans of a brand or category and like it to be involved. Innovators are searching for themselves for new solutions and opportunities of new products. Gatekeepers make suggestions for new products and test products for relevancies. Those are mainly involved for product improvement. *“These two groups are put together to find different ideas for different scenario’s”*.

The selection of these consumers can be very important for the success of the community. Through different channels, i.e. Facebook, company websites, other communities, and consumers can be forwarded to a questionnaire at this company. Consumers are asked if they are intrinsically motivated for that research community. *“Most of the times, more consumers are interested to participate in the community than available. So we try to select a heterogenic group with consumers with different characteristics”*. Consumers need to step out of their comfort zone.

“There is a difference between intrinsic and extrinsic motivation, we focus on intrinsically motivated consumers, who like to be involved with certain brands or categories”. However, *“to lower the threshold, we give them something small which is not proportional with the time needed for the project. It is a gift voucher of thirty euro. It is an incentive to get them inside”*.

The other interviewee described that companies can use each consumer or user it wants. *“Innovators are the ones who are most suitable; however it is not only about the consumer, but also about the expert of the product and the supplier”*. This is also more or less stated by another interviewee. The consumer that should be involved depends on many factors. The goal of the involvement, but also if it is a technical innovation or a new consumer product which focuses on latent consumer needs. For technical problems, the ‘average’ consumer or user of the product cannot be involved, as engineers, experts and technologists from all over the world should be involved. But also for radical consumer products, the ‘average’ user of the product should not be involved as that user will never be radical. For this type of innovations, a large and diverse group of consumers should be involved, from different sectors, people with and without experience with the product, people who understand the context in which the product should be developed, and without to create the optimal conditions for out of the box ideas.

Interaction

In the research by Janssen (2011), many companies involved consumers to test products in-home. This was done because in the food industry, consumers need to smell, taste and feel the product. However, in-home testing was done by only one company in the case studies. The monitoring of this use could be done online as well. Monitoring the use of products through interaction online has an advantage according to one interviewee: *“You can obtain a good view of all product characteristics, how do consumers handle the product, from buying, to using and to waste. The entire life cycle can be monitored very easily”*. An often used argument in the case studies was that food cannot be tested online. One company argued: *“We can discuss taste as one of the several dimensions, but core taste tests should be performed by other companies”*. But not only the flavor influences the taste of a product, other factors such as perception and the environment are also important. Those variables could be tested online. As stated before, interaction should not only be stimulated between company and consumer, but also with suppliers, customers and experts. According to one interviewee, this enhances the search for new applications of the product, to develop it, but also to decide how to sell and to distribute the product.

According to one other interviewee, the success of innovation communities is that consumers like the interaction with each other and with the company. *“Thinking about your own product is routine*

for employees, but for a consumer it is special". So interaction is viewed as a factor of success for communities. However, there is also one major challenge, how do companies stimulate interaction. Active community management could stimulate the interaction. According to one interviewee, the interaction in the incubation phase is higher than in the discovery- and commercialization phase. However, more interaction in all phases could contribute to the quality of the involvement. The challenges for active community management are described in the next paragraph.

Size and type of company

In this research, different companies have been analyzed. Large companies have more funds to involve consumers, but this does not imply that large companies involve consumers more often. An interviewee stated that consumer involvement is not more difficult for small companies than for large companies. With the use of social media, it is very easy to reach large groups of people. A company can start immediately with posting a question on Facebook or LinkedIn and inviting consumers in their community.

One interviewee argued: *"Small companies have naturally more contact and close relationships with their consumers, more ongoing collaboration than a single co-creation project of a large company. Large companies have on the other hand economies of scale but stay, in principle, further away from their consumers"*.

This suggests that small companies would be more able to set up an ecosystem as discussed before with customers and suppliers they know. However, for small companies it is much more difficult to use more than one medium to interact with all the different parties which is suggested.

Large companies have often more than one platform. In an ecosystem, next to the often used medium Facebook, a Twitter account and an innovation community, events and meetings should be incorporated. Also those activities should be used to interact with others about the product. Small companies need to centralize their interactions with consumers, as it is otherwise too costly and time consuming to stay connected with your consumer. This, however, has influence on the heterogeneity of the interaction.

For companies working in the business to business segment it maybe even easier to build an ecosystem, a continuous innovation community. They already have a more personal contact with their customers than companies in the business to consumer segment. *"The one on one contacts with account managers, teams and customers ensure that businesses active in the b-to-b segment have already a lot of contact with their most important consumers"*.

Confidentiality

The third research question focused on the sharing of innovations. For some companies it was a risk and others viewed it as an opportunity. One interviewee stated during the expert interview: *"We state it as the rules of the game. There is always a risk of leaking, but with more than hundred projects a year, we never had any problems"*. This company has non-disclosure agreements for participants and they are sometimes adapted. *"The screening of consumers is very important. People who work in the same sector will not be involved in our research community"*. Consumers are scanned for links with related and/or competing companies. That company also states that how further in the innovation process consumers are involved, how more important the protection and security of information is; so it depends on the phase in which consumers are involved.

According to another interviewee, sharing of innovations is a barrier for companies to involve consumers. Especially in the development phase. However, the interviewee is an opponent of non disclosure agreements. *"If you ask consumers to sign a non disclosure agreement, you show no confidence. Consumers will be suspicious and maybe do not perform to the fullest"*. So non disclosure agreements may have a negative impact on the interaction.

One interviewee ascertained that both approaches, the protection- and the open approach or sometimes the old and the new model called, exist and will always exist. Companies will not choose one or the other. At the moment, more and more companies are opening up their innovation efforts,

more consumers and users are involved, however, the number of patents has increased lately as well. Companies will always protect their technological innovations. DSM for example, uses open innovation, and Philips asks a community of three thousand radiologists on LinkedIn for ideas. These companies will continue to patent their technologies, and this will be the same for companies in the food industry.

4.3.2 Challenges for crowdsourcing supporting radical product innovations

Next to the opportunities of innovation communities, there are also some challenges which work as barriers for involving consumers. During the case interviews, one interviewee stated: *“I think it is a step in the right direction to use research communities and to interact like this with your consumers. But it is still in a controllable situation. The essence is, most valuable information you will get is from a completely uncontrollable and spontaneous environment. People are not supposed to know they are being watched, interviewed, or they are being asked about their opinion.* The challenge for innovation communities is according thus to this interviewee, to make the involvement uncontrollable.

Another barrier is the quality of the database. *“The main question is, how does the database look like and how valid are the answers you get? You should invest in your database to attract new consumers continuously, select on demographic factors, so people are not allowed to participate in two projects in the same sector. It’s all about a representative sample. It is important to have a large database. Idea generation is possible, but you should have three or four concepts already which can be changed, based on consumer ideas”*. Next to these two citations from the case studies, the experts mentioned different challenges related to two topics, lack of interaction and internal organization.

Lack of interaction

One of the most interesting challenges is how you can get consumers to participate actively in the community. One interviewee argued: *“We get a lot of positive reactions of people who like it and think it is a good idea such a platform, but the step towards uploading an idea is often too big”*. Apparently, it is difficult to share ideas and to start interacting with each other. *“There is so much knowledge in the world, but how can you make use of that?”*. This can be improved by active community management. *“We need to interact actively with consumers, stay in contact with them and make them feel involved. Not just for one purpose, but continuously”*. A specific owner of the community who is fully assigned and communicates continuously with the community would help. But also other tools were suggested to increase interaction in the community. Tight briefings, consumers mixed in teams, intermediate steps to stimulate people to respond to other ideas and sufficient communication and feedback from the company. A lack of feedback from the company on the uploaded ideas will reduce the enthusiasm of the community and thus the input.

Another factor that influences the lack of interaction is the offer of platforms these days. The number of platforms is increasing, but consumers are not participating at all those platforms. Consumers will choose the platform with the most interaction and which suits him or her the best. According to an interviewee, small companies therefore, need to centralize interaction with the consumer; otherwise it will become too difficult to attract consumers.

Internal organization

As was stated in the beginning of this paragraph, companies are not ready or internally designed yet for involving consumers. Missing of consumer involvement in the strategy is one cause, but also the leadership, the role of the company representative and the responsibility within a company function as barriers for consumer involvement.

The first challenge concerns the lack of an overall strategy regarding the involvement. This is related to leadership, structure and culture. Consumer involvement is not a single project. *“When you start involving consumers, there is no way back. A company cannot state that after involving consumers for ideas or advice, thanks, now we’re going to do it by ourselves again”*. It is a continuous process.

Consumer involvement should be incorporated in the strategy of the business. It has to do how the company deals with campaigns, with consumers, with marketing, with their innovation process; it is not a single independent business process.

This is related to the internal structure of the company. One interviewee states that companies are not ready for this. *“What I experience is that the structure of many companies is not ready, ideal, or designed for it. Marketing, R&D and market research are all three different departments in an organization which surprises me. The internal structure of companies is not ready to involve consumers for radical product innovation. However, something is changing. Through more and more pilot projects between marketing, innovation and market research, those departments are working more closely together, which will enhance the opportunities of crowdsourcing”*.

The strategy is related to the type of leadership in the company and the culture. Culture starts at the top. *“If you have a CEO that is risk averse and not innovative, your company will not be either”*. A strong external culture is needed for real radical product innovations and involving consumers that should start from and be supported by the top. Involving others means listening to other views. Not all companies are able to cope with different opinions and to integrate those in their innovation process. The culture is also by other interviewees recognized as a barrier. Another interviewee describes this challenge: *“development is still viewed as something what should be performed inside the company. Apparently, many people think still, the designer’s job is to design, and marketing is the job of the marketer. People still think themselves as the best for the job. But they should focus more outside, be more open. It is happening now, but it is a slow process. The new generation is less protecting itself and is more open towards the outside world, to the consumer”*.

An essential role is played by the company representative. In the case that the interaction is facilitated by an external agency, *“the more the company representative is involved, the better. How more feedback we get from that person, how faster we can go”*. The problem at most companies is the time which representatives have. *“Now, they dive after work-time into the community, however this should become part of their job. Companies have to open up their job. We are the facilitators now, but they should adopt that role”*.

Also is stated that the more people from the company are involved in the interaction, from different disciplines, the better. *“Most of the times, only the communication department is involved. But you also need experts. Technologists and suppliers will not be able to interact with marketing; they speak a different language, so you need each discipline in the community”*.

Another issue is the responsibility within the company. *“Many companies already have problems with allocating responsibility for managing the Facebook page and the Twitter account; imagine consumer involvement on a large scale. Most companies are not designed for it yet, they still work with traditional market research and traditional customer satisfaction research, and that’s it”*.

4.3.3 Conclusions expert interviews

Based on the expert interviews, the relations between different variables and the consumer involvement technique crowdsourcing can be validated. By validating these relations between variables, the fourth research question is answered. Opportunities and challenges arise at each variable. Based on the expert interviews can be concluded that crowdsourcing is influenced by the phase in which consumers are involved, different company variables and confidentiality.

The content of crowdsourcing differs in each innovation phase. In each phase, the objectives, the type of consumers which should be present and the characteristics of the platform are different. In the discovery phase, an online platform offers the opportunity to attract many ideas from a large group of consumers relatively easily. In the incubation phase, the group of consumers should be smaller and only the most relevant consumers for the objectives of the involvement should be present. The cooperation between company and consumer is central in this phase. Regarding the

commercialization phase, depending on the objectives of the involvement, an approach similar to the discovery or the incubation phase should be chosen.

Two of the four consumer involvement variables are intensively discussed during the interviews: the type of consumers and the interaction. These two variables are critical for the success of consumer involvement, but as experts view these variables differently, the interpretation is difficult. Experts agree that lead users should be used, however the definition of such a user differs. The openness of the platform is also important for this process as it defines who is able to participate and who is not. The openness of the platform differs with the type of consumers at each phase.

Interaction between participants is defined as one of the success factors of crowdsourcing by the experts. However, many challenges are described by the experts. The quality of the database/consumers is critical to obtain relevant data from the community. In order to maintain interaction with this group, active community management should be organized. This relates partly to the internal organization, to the responsibility of this interaction within the company. Important topic for the company is who should be responsible for the interaction with the community.

According to the interviews, this should be a group of different employees from different departments who interact on a constant basis with the community. This should be a task in of their daily job and this relates to a more strategic issue, how the company incorporates the involvement in the business.

Based on the interviews, the company should integrate the consumer involvement in the business strategy. This starts at the top which makes the role of the leader critical. Not only in assigning jobs and tasks to responsibilities, but also in creating a culture in which external input is embraced.

Next to the type of consumers and interaction in the community, crowdsourcing is also influenced by company variables. The size of the company, if a company operates in the business to business environment or business to consumer environment, and if a company is market-driven or technology driven, all influence the crowdsourcing process.

Large companies have often more funds, and often thus more platforms. Small companies on the other hand, need to centralize platforms to keep it manageable. One interesting outcome is that most companies state that innovation communities should be much easier to manage in the business to business segment as result of the already intense contacts with their customers. The difference between market-driven companies and technology-driven companies influences the content of the consumer involvement. But it may also influence the stimulus.

The sharing of innovations is both an opportunity as a challenge. The new model integrated by mainly new, small companies is to open up the innovation process for externs. However, protection of technological inventions will never stop, thus mainly the combination of opening-up the innovation process and at the same time, protecting important assets of the company, is a challenge for companies who search for input extern.

5.0 Conclusions, discussion, implications, limitations and recommendations for further research

Based on the results of this research, the central research question is answered in this chapter. In the first paragraph, the conceptual model is adapted to an empirical model which visualizes the researched relations between the different variables. In the discussion, the findings are compared with academic articles. In the third paragraph, both the managerial and scientific implications of this research are discussed. And in the final paragraph, the limitations of this research are coupled with recommendations for further research.

5.1 Conclusions

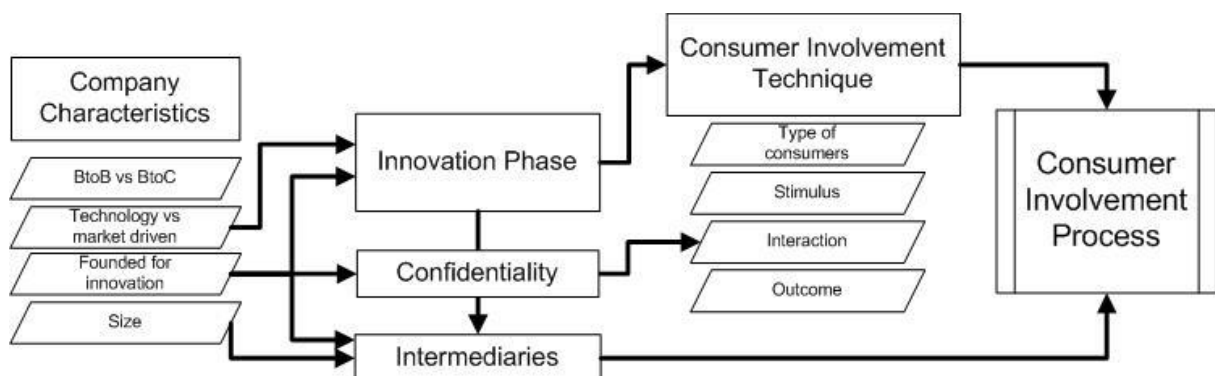
In the first chapter, the following central research question was formulated:

How can consumer involvement, in particular crowdsourcing, be used to support successful radical product innovations in the Dutch food industry?

With the use of four research questions, this central question was answered in chapter four. The most important conclusions are discussed below. The conceptual model as showed in the conceptual framework is reviewed based on the research results and adapted to an empirical model. This model is visualized in figure 5.1.

Figure 5.2 visualizes the conceptual model of crowdsourcing. This model is based on the research results of research question three and four. This conceptual model is an exploration of the field of crowdsourcing for radical product innovation.

Figure 5.1 Empirical model of consumer involvement supporting radical product innovation



Compared with the conceptual framework which was presented in the second chapter, some differences can be noted. In the conceptual framework was assumed that all company variables influence the phase, confidentiality and use of intermediaries. The case studies indicate however, that only three out of the four company variables have influence on the process. Also cannot be concluded that the innovation phase influences how companies deal with confidentiality. Results show that confidentiality only influences the interaction of the consumer involvement, instead of all four consumer involvement variables.

Consumer involvements characteristics

Based on the case studies can be concluded that mainly the innovation phase in which consumers are involved influences the consumer involvement. Consumer involvement among the three phases, discovery, incubation and commercialization, differs greatly. The four characteristics of consumer involvement, consumers, stimulus, interaction and outcome, all differ in each phase of the innovation process. Based on the phase in which consumers are involved, the type of consumers, the type and familiarity of the stimulus, the type, level and deriving of info of the interaction and the

type of info of the outcome are selected. Interaction is influenced by confidentiality. The risk of leaking valuable information negatively influences the interaction between company and consumer. The extent in which four company characteristics influence the consumer involvement is measured in this study. Figure 5.1 shows that two out of the four independent company variables influence the phase in which consumers are involved. If a company is technology- or market driven influences the phase in which consumers are involved and if a company is founded for that specific innovation also influences the phase in which consumers are involved. No results were found regarding the influence of the size of the company and if a company operates in the business to business or business to consumer segment in combination with the innovation phase. This is different than what was assumed.

The differences between technology- and market driven companies can be related to the outside-in versus inside-out culture. Results show that established companies involve fewer consumers than start-ups. In 4.3.3 is described that many companies still believe that marketing is the job of the marketer and research and development of the research and development department. Companies that are founded for a specific radical innovation involve consumers for acquiring knowledge, whereas established companies more rely on their already acquired knowledge.

Most consumers are involved in the incubation phase of the innovation process, whereas in only half of the cases consumers are involved in the discovery and commercialization phase. Consumers are mostly used to test products and/or concepts, and not used as sources of new products/concepts. Both the consumer involvement technique and the involved consumers are the same at almost all cases. Consumers are involved with the use of concept tests, product tests and professional taste panels. In the discovery and incubation phase, consumers are defined as amateurs whereas in the commercialization phase professionals are used. Apparently companies risk the use of amateurs in the first two phases, but not in the final phase of the innovation process. From this research can be concluded that the definitions of consumers by Urban and von Hippel (1988) and Rogers (2003) in the theoretical framework, are not applicable for this type of research. Companies and experts state that lead users and innovators should be involved; however companies do not use these typologies to involve consumers.

Only in the commercialization phase all involvements have the same characteristics regarding stimulus, interaction and outcome, namely product driven and familiar, the level is for, information is derived directly and the outcome is experimental. This involvement is fully focused on testing a product and involving a consumer as less as possible. Mostly in the discovery phase, consumers are involved for acquiring latent needs, where the outcome is explorative and the stimulus unfamiliar. In the incubation phase, also most consumer involvements focus on testing familiar products in a structured method and information is always derived directly. From this can be concluded that only in the discovery phase consumers are involved for supporting the ideation and creation of radical products. In all other phases, consumers are involved for testing products and not to develop products.

Organization of the involvement

As is showed by figure 5.1, both confidentiality and intermediaries influence the consumer involvement process. From the second research question can be concluded that most consumer involvements were performed by the company itself. However, in the cases that intermediaries are involved, this is influenced by the phase in which consumers are involved, the size of the company and if the company is founded for that specific innovation. Results show that mostly large and established companies enable the help of intermediaries, for small and newly-found companies it is often too expensive.

The phase in which consumers are involved influences the involvement objective of the outsourcing to intermediaries. In the discovery and incubation phase, intermediaries are involved for their network; in the commercialization phase for their experience and reliability.

The difference between an established and a newly found company influences how companies deal with confidentiality. Established companies are more afraid of losing valuable information during the consumer involvement than companies founded for a specific innovation. Those companies view the world as open and do not believe in protecting all their knowledge. The high risk of leaking information at established companies limited and prevented the interaction with consumers and thus influences the consumer involvement. The phase in which consumers are involved was not founded as influencer of confidentiality.

Crowdsourcing in the Dutch food industry

The method crowdsourcing was only used at one company for one consumer involvement. This has partly to do with the characteristics of the food industry. Companies believe that food tests cannot be performed online, as the consumer has to taste, smell and see the product. Other reasons are the costs of crowdsourcing, the view that it can only support incremental innovations and the few opportunities at the time of developing the product. There can be concluded that crowdsourcing is used to a very low extent for supporting radical product innovation. Companies still use the 'traditional' methods to involve consumers for radical new products. At the beginning, assumed was that the role of consumers in radical product innovations would be very different from the role in incremental innovations. However, there can be concluded that the role is more or less the same. Consumers are in both innovation processes used to filter or select the ideas with the most potential in the discovery phase and to test the products in the incubation phase and commercialization phase. Consumers are not used as source of radical ideas, but more as source of inspiration, validation and/or as guide of direction for the development.

Innovation communities

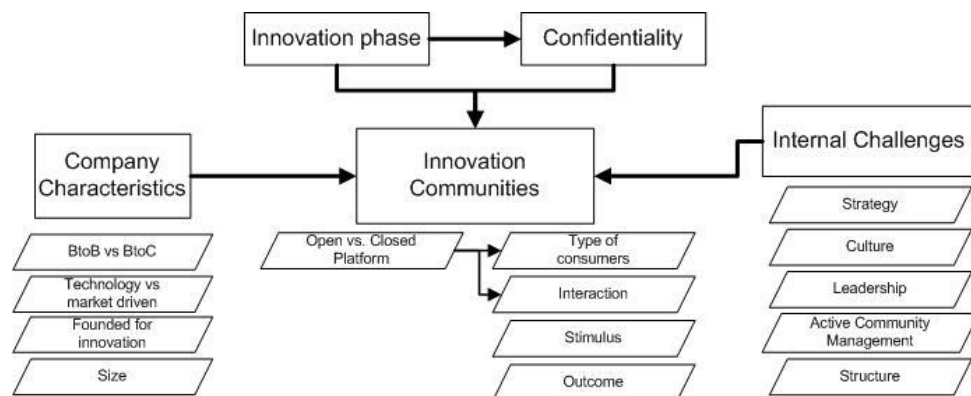
In order to validate the results of previous research question, as only one company adopted crowdsourcing, four interviews with experts are conducted. Figure 5.2 visualizes the proposed relations between different variables and innovation communities. Similar with Figure 5.1 is stated that the phase influences the use of innovation communities as method to involve consumers to a large degree. In each phase the involvement is different, but the involvement must be a continuous process. Based on literature which is described in the theoretical framework and the four experts is also confidentiality identified as important role in the process. All experts defined confidentiality as limiter of the online interaction with consumers and also is proposed that how further in the innovation process, the more important confidentiality is.

All the four independent company variables are identified as influencers of the process. Three of the four influence the consumer involvement process as showed in Figure 5.1. All experts stated that there are differences between BtoB and BtoC companies, thus also the fourth company variable is included in the conceptual model.

Five variables are included in the model concerning innovation communities: the type of consumers, the interaction, the stimulus, the outcome and the platform. Compared with Figure 5.1 is the last platform added. This specific characteristic of online involvement influences the innovation community to a large extent and also the type of consumers and the interaction, but not necessarily the stimulus and outcome. These characteristics are, similar with the empirical model, influenced by the phase in which consumers are involved.

Five internal issues are defined as challenges for innovation communities. Culture, structure, leadership, strategy and active community management are important company characteristics which influence the crowdsourcing process and especially the interaction with the consumer. Appropriate tools for dealing with these challenges are discussed in paragraph 5.2.

Figure 5.2 Conceptual model of crowdsourcing supporting radical product innovation



How can consumer involvement, in particular crowdsourcing, be used to support successful radical product innovations in the Dutch food industry?

In previous section, the four research questions are answered based on case studies and expert interviews. These results are used to assess how consumers can be used to support successful radical product innovations in the Dutch food industry.

Consumers are in this study involved in several ways to support radical product innovations. The involvements techniques differ on four aspects: type of stimulus, interaction, consumer and outcome. These are influenced by the phase in which consumers are involved, two company characteristics, confidentiality and the use of intermediaries.

All consumers are involved as sources of inspiration and validation and as guidance in the innovation process by choosing the most relevant product concepts and testing the products. Only in the discovery phase some involvements focus on latent consumer needs. Based on these results can be concluded that consumers are valuable for supporting radical product innovations. This successfulness however, depends to a large extent on the phase, the type of company, the consumers which are involved and the interaction between consumer and company.

Consumer involvement can be very relevant in all three phases of the innovation process to support radical innovations, however not for all companies. Technology driven companies that develop a technological radical product are not open for consumers and consumers lack the knowledge to be of added value. This in contrast to market driven companies. This study shows that established companies make less use of consumers than companies founded for that specific innovation. This does not imply however that consumers can be of less value for established companies. The size of the company influences the use of intermediaries and thus indirectly the consumer involvement process. No differences were found between companies operating in the business to business and business to consumer segment.

Due to a lack of data on crowdsourcing, no empirical model is presented on how crowdsourcing is used. However, with the use of four additional expert interviews, a conceptual model is developed to explore this field and provide data for further research. Based on this model can be concluded that next to the variables which also influence consumer involvement in general, also the type of platform is important and that five internal issues are identified as challenges for the crowdsourcing project.

As concluded above, consumers can be valuable for supporting radical product innovations in many different ways. However, consumers are not involved for radical purposes but for validating and testing products and concepts. As the central research question also contains an explorative aspect, in the discussion section is discussed how radical specific consumers can be and if they can be involved for real radical purposes. Also is the conceptual model of crowdsourcing discussed to explore the applicability of this model.

5.2 Discussion

In this study consumer involvement at eight radical product innovations is analyzed. Interviews with company representatives were conducted to analyze the methods how consumers were involved to support radical new products. The conceptual model which was presented in the conceptual framework was empirically tested and based on these results, an empirical model was presented in previous paragraph. Three independent company variables influence the phases in which consumers are involved, confidentiality and the use of intermediaries. The size of the company and if a company is technology- or market-driven are important, but the most influential independent variable is if a company is newly found for that innovation or established. Consumer involvement is the most influenced by the innovation phase in which consumers are involved. The innovation phase influences the four consumer involvement variables and the use of intermediaries. How companies deal with confidentiality influences the interaction between company and consumer and thus the consumer involvement. The crucial question in this study is if consumers can be of added value to support radical product innovations. This study shows that consumers are of added value, however more as source of inspiration and validation, than as source of radical ideas, which is in accordance with the results of Janssen (2011). However, this study presents several new findings concerning the consumer involvement process for radical product innovations. These indications of new relations are discussed in this paragraph. This section also includes a discussion about how radical consumers can be and the applicability of the crowdsourcing model.

Consumer involvement findings

In accordance with Hoyer et al (2010) and Janssen (2011) this study shows the importance of the innovation phase for consumer involvement. More interesting however, are the new identified relations. In this study the characteristics of the involved companies are taken into analysis. This is not done before and these results indicate two interesting relations. Also specific characteristics of the food industry and the influence of confidentiality on the interaction show interesting relations.

First of all, results of the case studies show differences between established companies and newly found companies in their consumer involvement process. This variable influences the phase in which consumers are involved, established companies have fewer consumer involvements in the discovery and incubation phase, and how companies deal with confidentiality, all established companies protected their innovations whereas companies founded for that innovation did not. These results indicate a relationship between the variable founded for innovation with the innovation phase and confidentiality. Second interesting finding of this study is the influence of the size of the company. From beforehand was assumed, as no research was conducted yet specifically on this relation, that the size would have a positive impact on the number of consumer involvements. This study shows however, that the size of the company does not have influence on the number of consumer involvements and the used techniques. These two relations show the contribution of including company variables in the analysis, which was not performed before.

A third interesting relationship is the influence of confidentiality on the interaction between company and consumer during the involvement. Research of Janssen (2011) found a relation between confidentiality and the stimulus of the involvement, however not on the interaction variable. Also Hoyer et al (2010) studied confidentiality in their research. Hoyer et al (2010) state that firms that rely greatly on secrets to protect proprietary knowledge in their NPD process, are less likely to engage in intense and wide-ranging co-creation activities. This suggests a relation between confidentiality and the number of consumer involvements. The study by Hoyer et al (2010) did however not focus specifically on radical product innovations. This study did and shows the concrete influence of confidentiality on the interaction between consumer and company. Results show that confidentiality risks limit and sometimes even prevent interaction, and thus consumer involvement. This concrete relation was not visualized before.

Previous research also studied the food industry, however the concrete influence of this industry on the consumer involvement process is never showed. Results in this study show the need for offline consumer involvement during the innovation process. There are several opportunities for online consumer involvement, however as the consumer needs to taste, smell and feel the product, offline consumer involvements are necessary. This distinguishes the food industry from other industries.

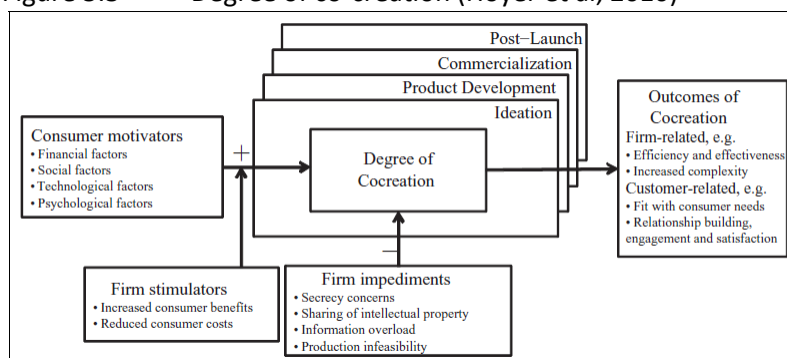
More interesting differences are found between the results of this study and the study conducted by Janssen (2011). In appendix D, the results of both studies are compared. Compared with the study of Janssen (2011), this study adds the commercialization phase to the analysis, but neglects the different types of radical product innovations.

The results of this study are largely in accordance with the results of the study by Janssen (2011). The companies that did not involve consumers introduced in both studies technological really new products. The consumer involvement techniques used by companies in both studies are also similar. In the discovery phase, a certain form of a concept test is used and in the incubation phase, product tests are used.

Main difference with the study of Janssen (2011) is the fewer number of consumer involvements in this study; the difference is especially large in the discovery phase. The differences between the two studies indicate a lower level of 'radicalness' in this study. This is caused by the stimulus and interaction in the cases. The stimulus in this study is more often familiar and product driven. The type of interaction is more structured; the level is lower and the deriving of info is more directly in this study. All these differences indicate that the analyzed companies in this study focused more on manifest consumer information than latent consumer information. The difference in level of interaction shows the lower intensity in which consumers are involved in this study. Consumers were mostly used to assist in the process by testing concepts and products, rather than playing an essential role in the creation of the new products. As Janssen (2011) did not define the type of companies, this difference cannot be explained by the influence of independent company variables.

The empirical model which is presented in previous paragraph can be used as complement of the model of Hoyer et al (2010). Hoyer et al (2010) developed a conceptual model to measure the degree of co-creation. This study shows the possibilities of measuring the degree of co-creation. The co-creation scope of companies can be measured by the number of involvements throughout the entire innovation process, and the intensity of the co-creation project can be measured by the level of interaction. Including the other variables of the involvement technique, stimulus, outcome and type of consumers improves this model.

Figure 5.3 Degree of co-creation (Hoyer et al, 2010)



Radical consumers?

This study shows the difficulties of finding the right consumer for the consumer involvement. As Urban and von Hippel (1988) state, only consumers who are at the leading edge of the market and are ahead of the majority of users in their population, are of real added value for real radical innovations. The case studies indicate that companies want to involve these type of lead users,

however as it is for companies difficult to involve the right consumer at the right time with the right method, often 'the consumer around the corner' is involved. This lack of fit between theoretical definitions and practical applicability, which is showed in this study, is reason to discuss how to cope with this and what consequences it has for the consumer involvement.

In a recent study by Filieri (2013) is showed that involving consumers at stages of the fuzzy front end may lead to effectively and rapidly matching emerging and latent customers' needs, and states that customers are capable of producing original, new and feasible ideas. And Heiskanen et al (2007) state that for radical product innovations, companies need to integrate consumer considerations at earlier stages of the innovation cycle. They state that consumers are very well able to understand the radical concepts and that concept testing should not be used as a pass/fail screen, but as an opportunity to learn more about potential impacts of the innovation on everyday life and society. This study however shows that consumers are involved for testing and validating products and concepts and not to find out about the impact of the innovation on life and society. Only in one case an in-home product test was conducted.

A question Hoyer et al (2010) ask, is which type of consumers should be involved in the co-creation process. Should a company include a broad segment of consumers to ensure successful customization or is it more efficient to focus on a small segment of very particular consumers. In this research this question was asked in the expert studies and all experts answered that the group of consumers should be as diverse as possible. Not only lead users or innovators should be involved, but also experts, technologists and consumers with and without experience with the product. In this study, consumers are categorized as amateurs and professionals. This definition however, does not provide a sufficient understanding of the different types of consumers. In order to be able to select lead users, another definition must be used which also can be adopted by companies. As stated by several interviewees, a diverse group of consumers should be involved. Jespersen (2010) defined four different types of users in relation to several phases, and this categorization suits the recommendations of the experts well:

- Lead users; creative and innovative users and cover all stages in the innovation process.
- Launching users; technical experts, active and engaged in new-product projects.
- Requesting users; provide input based on their needs, form of suggestions or complaints. Input is valuable in idea generation and in the post-launch phase of existing products.
- Pioneering users; try out prototypes and share their experience. This group of users may expect rewards as motivational factor.

Involving consumers who could be radical does not guarantee radical ideas, the interaction with those consumers is crucial. As showed in this study, the type, level and deriving of info depends on the phase in which consumers are involved. In this study, the level of interaction was mostly for/with, and not by. Consumers were thus not intensively involved. If companies want to involve consumers for radical purposes however, the level of interaction must be higher as more is demanded from consumers. This means an increase in confidence and more outsourcing to the consumer. Involving consumers more intensively and relying on them means for companies to open up not only their innovation process, but their entire way of doing business.

Besides a higher level of interaction, also the type of interaction must be changed. Consumers need to be triggered to think radically, and thus the interaction must be more unstructured. Based on each phase, the guidance of consumers should be decided and the right environment should be created. Regarding the stimulus of the consumer involvement, an interesting issue is discussed in this study: the selection of ideas. Two aspects of the stimulus are described in this study, the familiarity and the need vs. product stimulus. According to Janssen (2011), if companies involve consumers for real radical purposes, the stimulus should be need driven and unfamiliar. In this case the consumer comes up with the radical ideas and the company selects the right ones. As some interviewees stated in this study that consumers are not capable of this, further research should involve lead users to prove the opposite.

Crowdsourcing

This study shows that the method crowdsourcing is not often used to involve consumers for radical product innovation in the Dutch food industry. The specific characteristics of the food industry cause companies to involve consumers' offline. However, as the experts in this study state and literature shows, the opportunities to involve consumers online increase rapidly. For companies it becomes easier to select and follow a specific target group and costs of involving consumers online can be very low. And as consumers want to be heard more and the threshold for consumers lowers to interact online, companies become more open.

A recent study conducted by Bayus (2013) studied a crowdsourcing project at Dell. As many others, this study also does not differ between radical and incremental ideas, but Bayus (2013) describes some interesting findings. Bayus (2013) found that less than 4% of all submitted ideas were fully or partially implemented by Dell. Most consumers only propose a single idea, however ideas from serial ideators (participants) account for the largest share of implemented ideas. Past success however in generating implemented ideas, is found to have a detrimental effect on the likelihood of proposing another idea the organization eventually implements and to be negatively related to the number of diverse ideas proposed. Bayus (2013) also concludes that commenting on other's ideas has positive effects on the likelihood that those ideas are implemented and on the number of ideas proposed, but not on the number of diverse ideas proposed. These results show that companies must search for new consumers in the community on a continuously base as serial consumers become less diverse in their ideas, which does not enhance radical ideas. The company should also convert those new consumers in serial consumers, as this increases the likelihood of implementation of the idea. This is directly related to active community management, which is described in this study as challenge for companies involving consumers through crowdsourcing.

Crowdsourcing is used for incremental innovations more and more, the question rises if this will happen for radical purposes as well. The outcomes of the four expert interviews correspond to the results of two experiments, conducted by Janssen (2011). Janssen concluded that crowdsourcing techniques are very applicable for the generation of information for breakthrough innovation projects. Three success factors are:

- (1) the longer the interaction period, the better
- (2) create the possibility to respond pragmatically to consumer information
- (3) promote mutual learning, live contact with the consumer makes it possible to react to each other and stimulate further thinking, especially in the open and unrestricted context of an internet community.

All these factors concern the interaction between consumers with each other and with the company. In this study one of the topics which is intensively described, is active community management. According to Janssen (2011), establishing and maintaining interaction between consumers and new product developers is vital for radical product innovation. The results of this study concerning this topic are to a large extent similar to other literature. In this study the division of roles and responsibilities is discussed, and that a cross-functional team should interact with consumers. Janssen (2011) states that to ensure cross-function interaction with consumers, new product developers should pay attention to the alignment of commitment from all relevant departments and make all team members enthusiastic to participate. Also is suggested in this study based on the expert interviews that the consumer involvement should become part of the company's strategy and that it should be performed by the entire company; this is in accordance with Janssen (2011). An internal challenge which is not explicitly mentioned by Janssen (2011), but is stated in this study, is the role of the top of the organization, the leadership style. From the expert interviews can be concluded that the role of the top is crucial in creating a culture which is open for input from consumers.

Besides a multidisciplinary team and the recommendations for the internal organization, this study did not research in detail how the interaction should be organized. The work of Filieri (2013) can be used to complement this. Filieri (2013) shows, in accordance with results of Fuller and Matzler (2007) that the virtual environment can enable customers to express both tacit and explicit knowledge, which can be used for developing customer-centered new products. Practical examples of how interaction can be imitated and facilitated are presented by Filieri (2013): adopt a blog within the website, involve R&D and marketing staff in the provision of a response to every consumer's idea and use a tutor for helping customers to codify tacit knowledge.

This study presented, as described earlier, some challenges regarding crowdsourcing for companies. Also Hoyer et al (2010) define a threat of crowdsourcing, namely information overload. Clear involvement targets, continuous feedback from the company and interaction in the community about participant's ideas should diminish this factor (Hoyer et al (2010). Finally, von Hippel (2005) and Hoyer et al (2010) recommend a user toolkit in order to stimulate interaction in the community. This should ease the process of creating new ideas, products and marketing materials for potential participants.

In this study two interesting topics came forward which both are not extensively described in relevant literature. These topics however, can be very relevant for adopting crowdsourcing. On the one hand, the threat of outlaw communities for crowdsourcing should be taken into account by companies that conduct crowdsourcing projects. On the other hand, this study shows a new method for involving consumers who are highly interested in the project: crowdfunding for crowdsourcing. With this method, a form of lead users can be identified and easily be involved in the innovation process. These two topics are described in the recommendations for further research.

5.3 Implications

Based on the conclusions and discussion, this paragraph describes the theoretical and managerial implications of this research. This study contributes to scientific literature by validating relations between several variables and exploring new relations. For managers, this study provides a framework with variables which influence the involvement and an overview of challenges which should be taken into account by involving consumers for radical product innovations.

5.3.1 Theoretical implications

The results of this study have two theoretical implications. First of all, the empirical model of consumer involvement for radical product innovation validates prior found relations between variables and presents new empirical relations. Secondly, the conceptual model of crowdsourcing explores the field of crowdsourcing for radical product innovation and presents possible relations between variables.

The results of this study validate, but also improve the model of Janssen (2011). In accordance with Janssen (2011), this study shows the importance of the phase in which consumers are involved for the consumer involvement process. The applicability and relations of three consumer involvement variables, stimulus, interaction and outcome with the involvement process are also validated. The results of the case studies show similarities with the results of Janssen (2011), especially in the incubation phase, however differences are found mainly in the discovery phase. This implicates that consumer involvement in the discovery phase should be researched more in depth to find generalities.

In accordance with the conclusion of Janssen (2011), this study concludes that consumer can be very valuable for companies supporting radical product innovations, however as sources of validation of concepts and products, and not as sources of radical ideas. This conclusion indicates that the

difference between consumer involvement in incremental innovations and radical innovations is perhaps not that large.

The fourth consumer involvement variable concerns the type of consumer which is involved. Literature presents several typologies which can be used to define the consumer, however no applicable methods were found for measuring the type of consumers in this study. The theory of lead users by Urban and von Hippel (1988) and the typologies of Rogers (2003) are not applied by companies. In this study, a different definition is used to define the involved consumers, the definitions of amateurs and professionals. However, also this definition does not provide a sufficient understanding of the involved consumer. This implicates that a more suited typology needs to be developed.

Compared with the study of Janssen (2011), this study provides several new insights in the consumer involvement process and factors that influence the process. This study shows concrete the influence of confidentiality and intermediaries for companies involving consumers, but especially the adding of company variables in the analysis provides new insights in the consumer involvement process. This study shows the influence of three company variables on different variables in the consumer involvement process. The size of a company and if a company is market- or technology-driven influence respectively the use of intermediaries and innovation phase. The most influential company variable however, is founded for innovation; if a company is newly found for that specific innovation or already established. This variable influences the phase, confidentiality and use of intermediaries. These findings indicate the necessity of including these variables in the analysis. From beforehand was assumed that also the segment in which the company operates, business to business or business to consumer, influences the consumer involvement. No relations were found however between this variable and others.

Results of this study also contribute to the model of Hoyer et al (2010). The measurement of the degree of co-creation can be enriched with the dimensions of the model of Janssen (2011). The scope and intensity of the co-creation process can be objectively measured by the phase in which consumers are involved and the interpretation of the four dimensions. Measurement of co-creation with this enriched model will produce more reliable and objective results than the model will now. The final implication of this research is the distinction between co-creation and crowdsourcing. In the theoretical framework of this research, co-creation was viewed as part of crowdsourcing. However, some experts identified during the interviews a clear difference between crowdsourcing and co-creation and did not view co-creation as part of crowdsourcing. This suggests that theoretical definitions of crowdsourcing are not in accordance with definitions in practice.

5.3.2 Managerial implications

For managers, this study provides a framework that increases the understanding of the variables that influence the consumer involvement process and which should be taken into account by organizing the involvement. The conceptual model presents both opportunities and challenges for involving consumers via crowdsourcing which explore this often unknown field of business. Also the specific characteristics of the food industry provide interesting information for managers.

The empirical model, as presented in paragraph 5.1, shows the relevant variables in the consumer involvement process. The influence of the different variables on the consumer involvement variables increase the understanding of managers of the complex process of involving consumers. This model highlights the importance of the phase in which consumers are involved for the consumer involvement process. Most companies involve consumers in the incubation phase of the innovation process. This study however, shows the possibilities of the discovery and commercialization phase. Awareness of the possibilities in different phases and the advantages of consumer involvement per phase benefit the company in the organization of the involvement. The empirical model shows next

to the influence of the innovation phase, also the influence of company variables, confidentiality and the use of intermediaries. This is the first empirical model which includes all these variables.

This study also shows the specific characteristics of the food industry and the consequences for consumer involvement in the food industry. As many interviewees stated, consumers need to smell, taste and feel the product during their involvement. This however, does not imply that consumer involvement should always be performed offline. The conceptual model of crowdsourcing shows opportunities for involving consumers online. These opportunities include the different phases in which consumers can be involved, the platforms which can be used, the different types of consumers which are valuable and the advantages for different types of organizations.

Valuable for managers are also the challenges of online consumer involvement which are presented in this study. This study shows the importance of incorporating consumer involvement in everything the company does; in the strategy, in the structure, in the culture and in the style of leadership. Consumer involvement is not a one-time opportunity and project and cannot be related to only one department within the company. When companies start to involve consumers, there is no way back. Managers must realize this consequence of starting to involve consumers. Dealing with the challenges stated above, should improve the interaction with the consumer. These challenges and tools for dealing with these challenges, are described to assist the manager in organizing the consumer involvement.

5.4 Limitations & recommendations for further research

This paper ends with a description of the limitations of this research and recommendations for further research. The first limitation concerns the theoretical framework, the second the methodology, the third a consumer involvement variable and the fourth the research in general. For each limitation, a recommendation is made for further research. Five additional recommendations are described in the final part of this paragraph.

5.4.1 Limitations and related recommendations

The definition of 'radicalness' or 'radical' product innovation is a difficult issue in this research. In the theoretical framework a clear definition is formulated. However, during the interviews the subjectivity of this concept was noticed. Company representatives talk and think from their own reference frame and thus use their own definition of a radical product. In order to clarify this definition, in each interview the definition from the theoretical framework was explained. However this does not guarantee that all interviewees did understand the definition clearly. Besides the possible indistinctness of the definition, this subjectivity could also have biased the selection of the cases. Each selected product innovation was defined as a radical product innovation. This was done based on available information online, several interviews and the definitions in chapter two. However, as the definition leaves room for own interpretation, there cannot be stated that the selection of the cases and the interviews are not biased by this definition.

In order to resolve this threat, further research should distinguish the different types of radical products and focus on a specific type. By explaining specifically the type of innovation, technology new product, trend break new product or breakthrough new product, the interviewee must have a clear understanding of the concept.

The second limitation of this research concerns the methodology of this study. The limited number of interviews for each case threatens the internal validity of this research. In order to conduct a reliable case study, the representative responsible for the product innovation was selected for the interview. In each case, this person did perform the interview. Based on this fact, no more interviews were conducted with other company representatives. This could threaten the internal validity of the results as the results were not validated. The other limitation regarding the methodology is the

heterogenic sample of companies, but also the low number of companies per category. The external validity is increased through the use of a heterogenic sample of companies. Four company variables were included to analyze the different companies and to measure the influence of these variables on the consumer involvement. This heterogeneity however, also complicates the process of externalizing the results. As the sample of companies is diverse, not many companies per category are included in the research. This limits the external validity of this research.

As this research shows the influence of the different company variables, further research should focus on specific companies regarding the involvement of consumers supporting radical products.

The third limitation concerns an applicable typology of the involved consumers. As stated before, theoretical definitions are not being adopted by companies to select or type consumers. This makes it difficult to draw conclusions about the involved consumers in this study. In the theoretical framework and the conceptual framework, most emphasis is placed on the definition of Urban and von Hippel (1988). However, during the analysis of the results the typologies of Jespersen (2010) were found much more relevant, as most interviewees suggested to involve a diverse group of consumers. Further research should include the typologies of Jespersen (2010) and focus on methods to measure the different types of consumers accurately.

The fourth limitation is an aspect which is not included in this research, namely the positive outcomes of consumer involvement for companies. According to Hoyer et al (2010), by successfully implementing and managing co-creation, a firm can create two significant sources of competitive advantage: productivity gains and improved effectiveness. Benefits can be firm-related, efficiency and effectiveness benefits, but also customer related, fit with consumer needs, relationship building, engagement and satisfaction (Hoyer et al, 2010). Through the delivery of increased value and by increasing the number of connection points between the firm and consumers, co-creation may strengthen the consumer-firm relationships and thereby improving customer equity. This are interesting topics for dealing with the challenges as discussed in the internal organization. Known benefits of consumer involvement will assist the company in the organization of the involvement. Companies will never incorporate consumer involvement in their strategy, leadership and culture as the benefits are not clear and measurable. Interesting topic is thus how firms can measure the benefits of the consumer involvement process. This should be extended by researching the interaction, the benefits of it and word of mouth as outcome, as this is experienced by companies as one of the biggest advantages of consumer involvement.

5.4.2 Other recommendations

Next to the recommendations based on the limitations of this work, some other interesting topics which are described in this research are recommended for further research.

Discovery phase

In this research is showed that consumer involvements in the incubation and commercialization phase are to a large extent similar to each other. These involvements also correspond with the results of Janssen (2011). However, results of consumer involvements in the discovery phase differ from each other and also the results of this study differ from the results of Janssen (2011). More research is thus needed to validate the involvement of consumers in the discovery phase of radical product innovations.

Outlaw communities

During the interviews, one outlaw community was identified. This outlaw community was related to the only company that conducted online research. Not much research is conducted yet on outlaw communities and research specific on the food sector is even scarcer. The outlaw community discussed in this study made the company aware of the disadvantages of the internet. As this was new for that company as well, no clear guidelines about how to deal with the community were

available. More research must be conducted on the existence of outlaw communities in the food industry and the influence on sharing of innovations of companies and the innovation process.

Ecosystem

The ecosystem was mentioned by one interviewee during the expert interviews. The ecosystem was used as metaphor for how companies could organize their innovation process for developing radical product innovations with external parties. In an ecosystem, the company involved all different types of consumers, but also suppliers, distributors and maybe even competitors. This is closely related to the field of open innovation. Interesting is into what extent this form influences radical product innovation, compared to the involvement of only consumers in the innovation process.

Crowdfunding for crowdsourcing

During the case interviews, one interviewee described an approach of involving consumers in the innovation process which was not found in theory. A relatively new concept is the concept of crowdfunding, in which companies attempt to get their new product ideas funded online. That company wanted to involve consumers that funded the new product for the development of the new product. So consumers were not only involved financially, but also in the development. The company described these kind of consumers as much more relevant to involve for the development of the new product, as those consumers were now stakeholders. This combination of crowdfunding and crowdsourcing is very interesting as crowdfunding can be a new method to select consumers. More research is needed to explore this new opportunity.

Crowdsourcing for co-creation

One expert interviewee suggested that the ideal involvement process should contain crowdsourcing in the discovery phase and co-creation in the incubation phase. This should be extended with or crowdsourcing or co-creation in the commercialization process, depending on the objectives of the involvement. One of the interesting aspects of this combination is the use of open and closed platforms. As suggested by this interviewee, crowdsourcing should be conducted on an open platform and co-creation on a closed platform. However, involvements in the food industry should also contain offline involvement. More research is needed to explore the specific opportunities of crowdsourcing and co-creation in the specific phases of the innovation process and how this should be organized.

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Appendix

A: Process of building theory from case study research

(Eisenhardt, 1989)

Process of Building Theory from Case Study Research

Step	Activity	Reason
Getting Started	Definition of research question Possibly a priori constructs	Focuses efforts Provides better grounding of construct measures
Selecting Cases	Neither theory nor hypotheses Specified population Theoretical, not random, sampling	Retains theoretical flexibility Constrains extraneous variation and sharpens external validity Focuses efforts on theoretically useful cases—i.e., those that replicate or extend theory by filling conceptual categories
Crafting Instruments and Protocols	Multiple data collection methods Qualitative and quantitative data combined Multiple investigators	Strengthens grounding of theory by triangulation of evidence Synergistic view of evidence Fosters divergent perspectives and strengthens grounding
Entering the Field	Overlap data collection and analysis, including field notes Flexible and opportunistic data collection methods	Speeds analyses and reveals helpful adjustments to data collection Allows investigators to take advantage of emergent themes and unique case features
Analyzing Data	Within-case analysis Cross-case pattern search using divergent techniques	Gains familiarity with data and preliminary theory generation Forces investigators to look beyond initial impressions and see evidence thru multiple lenses
Shaping Hypotheses	Iterative tabulation of evidence for each construct Replication, not sampling, logic across cases Search evidence for "why" behind relationships	Sharpens construct definition, validity, and measurability Confirms, extends, and sharpens theory Builds internal validity
Enfolding Literature	Comparison with conflicting literature Comparison with similar literature	Builds internal validity, raises theoretical level, and sharpens construct definitions Sharpens generalizability, improves construct definition, and raises theoretical level
Reaching Closure	Theoretical saturation when possible	Ends process when marginal improvement becomes small

B: Interview protocol case studies

Topic	Sub-topic	Interview question
Introduction of interviewee	Person	What is your position in the company? For how long do you work in the company?
Innovation	Product	What is the product innovation? Why is it unique? How is it developed?
<i>Consumer involvement</i>	<i>Technique</i>	Were consumers involved in the development of the product? How?
Characteristics	Type of consumers Innovation phase Stimulus	Which type of consumers participated? Why were these consumers selected? When in the innovation phase did they participate? Are consumers exposed to concepts/products (product driven) or to problems (need-driven)?

	Interaction Outcome	How is the interaction between company and consumer structured? Which added value do consumers have? What is the outcome of the involvement (explorative -, experimental information or something else)?
<i>Sharing of innovations</i>	Risk Solution	What are the risks of sharing innovation for you? Do you protect your valuable information and if yes how, if not, why not? What do you protect? Are your measures enough to ensure the protection of your knowledge, but does it still provides enough stimuli to elicit information?
<i>Role of the facilitator</i>	Internal/external Roles	Who is establishing and maintaining interaction between company and consumer? Why this person/agency/department? Does it have influence on the success of the innovation? Which role does this person/agency/department have? Do you think the following roles are important (scale from 1 to 5) and which one does your facilitator adopt? <ol style="list-style-type: none"> 1. Technical set-up of the platform and content in community 2. Guarantee confidentiality 3. Bridge for different languages between various actors 4. Other?
Potential	Crowdsourcing Internet Consumers	Do you think companies will adopt more crowdsourcing in the future for radical product innovation? How? What will be the role of the internet for radical product innovations? Will the role of consumers for radical product innovations change over time?

C: Interview protocol expert studies

Introduction	Person & company	What is your position/role in the company? What does the company do?
Innovation communities		How do you view innovation communities? How can innovation communities support radical product innovations? <ul style="list-style-type: none"> - How should it be organized? - Which phase of the innovation process? - Which consumers should participate? - How does the interaction look like? - For which type and size of companies is it interesting?

		- What is the role of the company representative?
Crowdsourcing	Radical	To what extent do consumers come up with real radical innovations?
Sharing of innovations		How do you look at freely sharing of innovations?
Social Media		What is the role of social media?

D: Consumer involvement compared

	<i>Janssen (2011)</i>		<i>This study</i>		
<u>Phase</u>	Discovery (7/9)	Incubation(9/9)	Discovery (3/6)	Incubation (5/6)	Commercialization (3/6)
Technique	Concept tests (6/7) Pre-test (1/7)	Product test (3/9) In-home product test (3/9) Combined concept/product test (3/9)	<i>3 phases, 4 tests</i> Concept test (3/4) Feasibility study (1/4)	In home product test (1/5) Product test (2/5) Concept test (1/5) Interviews (1/5)	Taste panel (2/3) Product test (1/3)
Consumers	Not specified (7/7)	Not specified (9/9)	Amateurs (3/3)	Amateurs (5/5)	Amateurs (1/3) Professionals (2/3)
<u>Stimulus</u>					
Type	Product (2/7) Need (6/7)	Product (9/9) Need (4/9)	Product (2/4) Need (2/4)	Product (3/5) Need (2/5)	Product (3/3)
Familiarity	Familiar (1/7) Unfamiliar (6/7)	Familiar (6/9) Unfamiliar (5/9)	Familiar (1/4) Unfamiliar (3/4)	Familiar (4/5) Unfamiliar (1/5)	Familiar (3/3)
<u>Interaction</u>					
Type	Structured (1/7) Unstructured (6/7)	Structured (9/9) Unstructured (7/9)	Structured (2/4) Unstructured (2/4)	Structured (3/5) Unstructured (2/5)	Structured (3/3)
Level	For (0/7) With (4/7) By (3/7)	For (5/9) With (4/9) By (0/9)	For (1/4) With (3/4)	For (2/5) With (2/5) By (1/5)	For (3/3)
Deriving of info	Directly (3/7) Indirectly (5/7)	Directly (9/9) Indirectly (0/9)	Directly (2/4) Indirectly (2/4)	Directly (5/5)	Directly (3/3)
<u>Outcome</u>					
Type	Explorative (7/7) Experimental (0/7)	Explorative (2/9) Experimental (9/9)	Explorative (3/4) Experimental (1/4)	Explorative (1/5) Experimental (4/5)	Experimental (3/3)

E: Phases in radical product innovation

(Janssen, 2011, p. 43)

Booz, Allen & Hamilton (1980)	Cooper and Kleinschmidt (1986)	Song and Montoya-Weiss (1998)	Veryzer (1998)	Tidd and Bodley (2002)	Crawford and Di Benedetto (2000)	Vuola and Hameri (2006)
DISCOVERY						
Exploration	Initial screening	Strategic project planning	Dynamic drifting	Concept generation	Opportunity identification	Discovery
Screening	Preliminary market assessment	Idea development and screening	Convergence	Project selection	Opportunity selection	Company NPD Product idea
Business analysis	Preliminary technical assessment	Business and market opportunity analysis	Formulation		Concept generation	Feasibility study
	Detailed market study		Preliminary Design		Concept / product evaluation	
Development	Business analysis					
INCUBATION						
Testing	Product development	Technical development	Evaluation preparation	Product development	Development	Prototype development
	In-house product testing	Product testing	Formative Prototype			Testing and validation
	Customer tests of products		Testing			
			Design Modification			
			Prototype			
COMMERCIALISATION						
Commercialisation	Test market / trail sell	Product commercialisation	Commercialisation	Product commercialisation / review	Launch	Product launch
	Trail production					Market
	Precommercialisation business analysis					
	Production start up					
	Market launch					

F: Explanation of the differentiating requirements

(Janssen, 2011, p. 87)

Dimensions	Requirements	Explanation
Participants (based on Urban and Von Hippel (1988), Rogers (2003))		
<i>Company</i>	R&D	Tasks of professionals: shaping new technologies; finding applications of existing technologies; clarifying technologies to the consumers.
	Marketing	Tasks of professionals: shaping consumer needs; eliciting future consumer needs, and assuring that consumer needs are fulfilled by the product.
<i>Consumers</i>	Innovators	Consumers who are eager to try new things and usually have the ability to understand and apply complex technical knowledge.
	Early adoptors	Consumers who are more integrated in real life settings than others and are social leaders and well educated, who provide advice and information sought by other adopters and who have a reputation to successfully decide on improvements.
	Early majority	Consumers who will adopt new ideas just before the average consumer, who think carefully before accepting new ideas and have many informal social contacts.
Stimulus ; based on Van Kleef et al. (2005), Patnaik and Becker (1999), Alba and Hutchinson (1987)		
<i>Type</i>	Need-driven	With this type of stimuli, consumers are not being exposed to concepts of the products, but problems / verbal communication are the source to elicit information.
	Product-driven	With this type of stimuli, consumers are confronted with (concepts of) products and thereby motivated to provide information.
<i>Familiarity</i>	Familiar	The stimuli is recognisable for the consumers, they have a reference frame for this the stimulus.
	Unfamiliar	Consumers have no experience with the stimulus, and do not recognise the stimuli by themselves.
Interaction (based on: Churchill (1995), Van Kleef et al. (2005), Kaulio (1998))		
<i>Type</i>	Structured	This type of interaction refers to gaining response that is highly predetermined; choices between alternatives can be made. The response is clear to the new product developers.
	Unstructured	This type of interaction refers to an open discussion without pre-set answer categories; consumers can respond in their own words. In-depth and detailed responses have to be analysed by new product developers.
<i>Level</i>	'For'	With this level of interaction, products are designed based on customer research but the customer is not further involved.
	'With'	With this level of interaction, customer can react upon displays of different concepts and discuss their opinions.
	'By'	With this level of interaction, customers are actively involved and participate intensively in the product design.
<i>Deriving of info</i>	Directly	New product developers derive information directly from the consumers e.g. by means of articulation.
	Indirectly	New product developers derive information indirectly from the consumers e.g. by means of observation.
Outcome (based on March (1991), Veryzer (1998), Van Kleef et al. (2005), Smith and Tushman (2005), Rochford (1991))		
<i>Type of info</i>	Explorative	Information is about understanding what drives consumers' decision processes, and about identifying which factors influence these processes. Information reveals futures that may be quite different from what is presently known.
	Experimental	Information is about concrete input for subsequent technical development stages. Trial-and-error, variation, flexibility and playing are characteristics of generating this type of information.
<i>Addressees</i>	R&D	Specialists are more product-oriented and require very concrete information about how to translate consumer-desired product attributes into target values for technical development.
	Marketing	Specialists are consumer need-oriented and require information about life-styles and consumption patterns in the future.

G: Most appropriate proactive consumer involvement technique

(Janssen, 2011, p. 100)

Technologically really new	
<i>Discovery</i>	<i>Incubation</i>
Lateral Thinking	Category appraisal
Synectics	Conjoint analysis
	Information acceleration
Trend break really new	
<i>Discovery</i>	<i>Incubation</i>
Applied ethnography	Applied ethnography
Consumer Idealised Design	Probe and Learn
Empathic Design	
Innovation Templates	
Breakthrough	
<i>Discovery</i>	<i>Incubation</i>
Applied ethnography	Applied ethnography
Crowd sourcing (develop)	Crowd sourcing (design)
Toolkit for innovation	Lead User Method (need)
Visioning / Back casting	Toolkit for innovation