Design Thinking and Food Innovation

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Abstract

This paper presents a new approach for food innovation—a Design Thinking approach that challenges the strong product orientation that still exists in the food industry. Consumer researchers widely believe that innovation in the food sector can be much more user oriented. Fork to Farm projects try to maximize value creation for the end user, but; unfortunately; many of these projects appeals to an undifferentiated mass market. The food industry needs to understand individual consumers and the context in which they live to be able to deliver successful new food solutions. The aim of this paper is to discuss and exemplify how Design Thinking can contribute to innovation in the food industry.

After introducing the Design Thinking approach and describing an innovation project conducted within the seafood industry in Norway, four specific aspects of Design Thinking: a) Begin at the beginning, b) Take a human-centered approach, c) Try early and often, and d) Seek outside help, are discussed in more detail. I conclude that Design Thinking is a faster and cheaper way to include the voice of the consumer into the process —a learning approach that needs to be further discussed, improved and tested out within the food domain.

1   Introduction

Design Thinking has during the last 10-15 years evolved from a way of thinking among engineers when designing technical products to become a buzzword among business people. A simple google search on the term "Design Thinking" reveal more than 300 million hits. When including "food" into the search, the hits reveal that Design Thinking is slowly making its way into the food industry too. Consultancy firms and non-profit organizations offer Design Thinking help to individual firms, branch organizations and public food and health organizations (Ifooddesign.org, thinkingfooddesign.com, ideo.com/expertise/food-beverage to mention a few). However, few scholarly articles exist on Design Thinking and food.

Most people, both laypersons and food scientists, perceive designing food as something the chefs do when they combine the different tastes (sweet, sour, salt, bitter, umami) with texture, odor and visual appearance into a correctly balanced food product, or when they combine different food ingredients into a great meal. Most people will perceive the famous fruit caviar created at El Bulli in Spain that looks like caviar but taste like an explosion of fruit as a good example of designed food. A restaurant combining the meal with the interior, the lighting, the temperature, the music and the service into a holistic food experience, is another kind of food design. But neither the chefs' artistic design of a meal nor the creative food space design taking place within a restaurant will be discussed here. In this paper, I will discuss Design Thinking as understood by the engineering community.

Brown (2008) define Design Thinking as a discipline that uses the designer's sensibility and methods to match people's needs with what is technical feasible and commercial viable. The roots of the approach seem to go back to the eccentric professor John Arnold (1913-1963), who was famous for making his engineering students at MIT imagining that they designed for someone from outer space instead of for their peers or their mums (who always liked their design). In 1957, Arnold came to Stanford University where he built up the engineering design school. One of his students was David Kelly who later founded the now world leading design firm IDEO as well as the D.school at Stanford University. Some state IDEO and D.school as the roots of Design Thinking, but it is probably more correct to label David Kelly as a true Design Thinking missionary and the one who managed to spread the Design Thinking approach to the world outside the engineering lab (source: The Design Thinking group at LinkedIn). Simon (1969) "The science of the artificial", Schon (1984) "The reflective

Practitioner: How Professionals Think in Action" and Buchanen (1992) "Wicked Problems in Design Thinking" are other sources frequently mentioned as important sources for Design Thinking. Some even state that the philosophical roots of Design Thinking can be traced back to John Dewey (1934) "Art of Experience" where Dewey proposes that there is a continuity between the refined experience of works of art and everyday activities and events, and in order to understand the aesthetic one must begin with the events and scenes of daily life. Undoubtedly, continues refinement and immersion into daily life events fits well with how Design Thinking often is defined today. According to Brown (2008) the Design Thinking philosophy can become a part of every firm's innovation process. The clue is a) to involve Design Thinking at the very start of the innovation process before any directions has been set up (Begin at the beginning), b) to focus on human behaviors, needs, and preferences along with business and technology considerations (Take a human-centered approach), c) to create an expectation of rapid experimentation and prototyping (Try early and often), and d) to expand the innovation ecosystem by looking for opportunities to co-create with customers and consumers (Seek outside help). Design Thinking is an approach where the participants immerse them self into different situations to learn as much as possible as fast as possible. Design Thinking merges different "realities" and bridges the gap between different knowledge fields. The aim of this paper is to discuss and exemplify how Design Thinking can contribute to innovation in the food industry, by discussing these four aspects of the approach.

2   Methodology and Case descriptions

Due to the contextual character of the Design Thinking project under investigation, a single case study design was adopted. According to Yin (2009), a case study design fits well in investigations where contextual conditions not easily can be distinguished from the phenomenon. In this case, the fuzzy boundaries between the innovation project observed and the research institute context creates a complexity that can be neither ignored nor reduced. I have constructed the case based on my own observations from participating in the project, in depth interviews with the other participants and analyses of secondary data as reports and power point presentations.

A Design Thinking case form the seafood industry in Norway

The project that run from April 2008 until December 2009 was owned and funded by NSL (The Norwegian association for seafood producers') aimed at developing new seafood on the go concepts. Nofima (a Norwegian research institute for aquaculture, fish and food) lead the project, which consisted of 13 involved persons from NSL, Nofima (two different departments), two fish processing companies, and one innovation management consultancy firm.

In the first stage of the innovation process, secondary data were gathered. All partners forwarded relevant information (market reports, publications, trend reports, results from previous studies conducted etc.) to a researcher who abstracted the essence and presented the findings to the project group. The secondary data showed that the number of Norwegian who eat fish three times a week had increased since 2005, that most of the fish were bought in grocery stores, that the value increase for the total seafood market from 2005 to 2007 of 7% mostly could be traced back to the service market (Catering, gas stations, kiosks etc), that there seem to be a trend of people who wanted to eat a healthy light meal on the go, that 2/3 of the food sold on the go was hot dogs, that consumption of pizza and hamburgers where growing, while sushi had become trendy- a symbol of healthy food, etc.… The learning point from analyzing the secondary data was that there seem to be a need for a healthier on the go food solution. The working title "seafood on the go" was launched.

The next step of the innovation process contained an observation study. All the partners got an observation book (a small note book for collecting information) and were told to go out into the field and observe, talk with people, search on the internet, attend food fairs etc, and to report all insights and learning points into their own observation book. The aim was for all the participants to become empathic with the users and the retailers, to immerge them self into the different situation and to learn as much as possible as fast as possible. A long list of learning points was generated from this exercise.

1. Food on the go is one hand food. Using both your hands while eating makes you stop.
2. Fish is often eaten because it is healthy. Why not position fish as something good, something you want to eat because of the good taste? Many Norwegians get bad conscience if they don't eat fish at least twice a week.
3. Food on the go is often small in between meals. They don't have to be a complete dinner. Many are on their way home for dinner.

4. Food along the road in Norway is often both bad and expensive. Consumers have negative attitudes and experiences.
5. The employees at the gas stations that offer food are young, often without food handling practice. The seafood products need to be easy to handle for them. Important to think about both time and hygiene.
6. Cannot heat up seafood at the same barbeque equipment as hamburgers and hot dogs. Will taste fish of the meat products if we do so. Not much space for extra ovens
7. Train commuters often put a newspaper on their nap while eating so they don't stain their cloths.
8. Children eating in the car often create a mess.
9. Food entertains children on long drives.
10. Drivers eat with one hand. But where to put down the food?
11. Men 50+ want warm food.
12. Truck drivers, who are the loyal costumer of the restaurants along the road, want traditional calorie rich food
13. Etc.etc.

The next step was to generate ideas for solutions and make simple prototypes. These prototypes were tested on the participants in the project and among colleagues and friends.

Simple visualization		
Simple prototype		

Figure 1. Examples of simple visualization and prototyping

The ten ideas that were liked the most where then furthered developed into idea platforms. Each platform consisted of an illustrative picture, a one sentence idea pitch, supported by observation, insights and quotes. These idea platforms very used as input to an idea generation workshop. The workshop consisting of all the participants in the project was facilitated by a trained moderator and a graphical industrial designer, who helped out visualizing the ideas that popped up during the process.

The car as a table.

Healthy and good food for everybody who is out driving.

Need to be fast, possible to eat in or outside the car. Everybody must get something they like.

One hand food

Have a little hunger. Need something to eat now.

No mess, possible to eat with one hand, preferably both good and healthy

Figure 2. Two examples of idea platforms

Figure 3. Examples of ideas visualized by the graphical designer during the workshop

The ten ideas were presented to a focus group, and based on the input from the idea workshop and the focus group discussions, the project group picked two ideas to evaluate further. One of these ideas was the "Autowrap". The observed consumer need for something to eat while driving, something easy to handle that do not create a mess in the car, was the idea behind Autowrap. The observation that most cars have cup holders and pockets inside the door or behind the seat, and that few flat surfaces, where food can be safely placed exist in cars became the point of departure for the creative problem solving. The project group teamed up with a design company to develop simple prototype solutions. Some of the solutions developed where:

- Wraps in cylinder shaped packages that fitted the cup holder.
  - one variety where the food could be squeezed upwards
  - one with a push-up solution
  - one with three small mini wraps in a drip protecting package
- A food package that works as a table in the car that easily can be stacked. Important that the product is stable while driving.
- Different food and drink holder solutions for the car (see figure 4)

Technical solutions for the car	Food solutions for the car

Figure 4. Examples of prototype solutions for the "Autowrap" idea

Different manufacturing and logistical solutions, as well as estimations of market potential for the different concepts were developed and presented to the project owner, NSF, a member association for seafood producers in Norway. The different seafood concepts developed in this project where made available to all the NSF member companies and each single member firm made responsible for evaluating the technical feasibility and business viability for them.

3   Discussion

This paper aims to discuss and exemplify how Design Thinking can contribute to innovation in the food industry. In the seafood case presented, all the four characteristics of Design Thinking as described by Brown (2008): a) Begin at the beginning, b) Take a human-centered approach, c) Try early and often, and d) Seek outside help, are observed. Below, I will discuss all these aspects of Design Thinking in more detail.

Begin at the beginning

Innovation within the food industry often starts with technical development, free capacity on a machine or under-utilized bi-products sparks creativity, and first when the new product is developed does R&D ask the market department for help with the commercialization. An old stereotype description you might say—today everybody knows that a successful innovation process starts with a good understanding of the market —I claim, that a product oriented approach still are much more common than a market oriented innovation approach. Fork to farm projects have been around for a long time, the research behind the Stage-Gate® model, which many Western food companies have implemented, states clearly that including the voice of the customer at an early stage is one of the most important success factors for innovation (Cooper, 1993; Cooper, 2008), and many firms even claim in their annual reports that improving their customers experience is a top priority. Unfortunately, being aware of the importance of including the voice of the consumer into the innovation process does not automatically lead to good market oriented systems and routines (Brandt 2008). A study from Journal of Marketing shows that firms struggle with linking customer insights data to organizational performance (Morgan, Anderson, Mittal, 2005). Few companies manage to integrate customer information

into their management and operations. Design Thinking can contribute by bridging this gap between knowing and doing. One of the pillars for Design Thinking is to start the innovation process by generating an understanding of the problem or even sometimes to find the problem.

Gathering market insights as fast as possible was the starting point for the seafood project described above. Everybody contributed with their own knowledge and information, which were accumulated and synthesized by a moderator. This is a typical Design Thinking approach starting with creating a common understanding of the problem to be solved. Design thinking starts by focusing on human needs, not what the producer needs (which would be a typical product/ producer oriented approach). Technical feasibility and business viability comes second and third in a Design Thinking approach. Design Thinking differs from how many perceives design, as a nice aesthetic wrap up of a product, a creative touch that can help sell a product, something designers do to an already developed product to make it more attractive to the customer. Design Thinking helps companies create ideas that better meet consumer's needs and demands (Brown 2008), and should be the starting point of the process not the end.

Take a human centered approach

Design Thinking predicts the importance of consumer empathy. To be able to develop good solutions innovation teams need to understand their users, how they think and what they feel in relation to the problem they aim to solve. This goes for all kind of innovations, also for food. The users are the experts, they know their problem. Design Thinking offers a set of technics for how to become empathic. Innovation teams need to leave the office, go out into the field and observe the users in their normal surrounding. By immersing them self into the life of their users and observing how they use and interact with the products they want to improve, they may capture unexpected insights. By watching and listening, by collecting stories and inspiration, they become better designers. According to the Design Thinking approach, innovation teams need to know their users and care about their lives to create meaningful innovations. In the seafood innovation project described above all the team members had to observe relevant users in different "on the go" surroundings, like while commuting, while feeding their kids in the car, while street walking etc. They were instructed to write down their most important observations and their learning points. These learning points became the base for the further development. If the innovation process had started from the seafood companies existing product portfolio and looked for new seafood on the go alternatives, the solutions offered would probably become very different from what came out of the more empathic market approach applied here.

Try early and often

Two of the main pillars of Design Thinking are «doing» and «learning». Design Thinking promotes action and fast learning, and creates an expectation of rapid experimentation and prototyping. Looking into traditional text books of innovation management (Crawford, 1997; Urban & Hauser, 1980) or more resent books of food innovation and product development (Jaeger & Mac Fie, 2010; Børresen, 2008) we find very little text related to prototyping. These traditional books offer definitions—a prototype is the first rough physical form of a new product-- but no detailed descriptions of how to prototype or why prototyping is important.

A prototyping mindset, where all problems are divided into smaller parts and resolved by step-wise practical prototyping, exists within Design Thinking (Kelly & Littman, 2001; Brown, 2008). Prototyping is a way of moving the project forward, prototyping is acting by building simple models or drawings sketches before knowing the answer, prototyping is thinking by building. The goal of rapid prototyping is to make mistakes or encounter discoveries as fast as possible. By making prototypes on unsolved problems, the idea is that accidental discoveries will be encountered.

In the case described above, the simple prototyping conducted by the participants as well as the sketches made by the graphical designer helped the communication within the team. Making a simple prototype model or a sketch is a very expressive way of showing an idea, internal thoughts becomes externalized and easily accessible for the team members who can observe, comment on and improve the idea (Kelly & Littman, 2001; Tversky, 2002). Prototypes communicate much better than language and stimulate to further action. Making a sketch that incorporates the relevant information and omits the irrelevant, not only reflects the mental idea and make fleeting thoughts more permanent, but also frees the working memory of the participant (Tversky 2002). Relieving the participants of the dual burden of holding the content and simultaneously operate on it, stimulate creativity and further problem solving. The philosophy behind Design Thinking is that prototyping doesn't have to be complex and expensive. Prototypes should command only as much time, effort, and

investment as are needed to generate useful feedback and evolve an idea. Prototyping is all about learning about the strength and the weaknesses and to identify new directions for further prototyping (Brown, 2008).

Seek outside help

Saguy (2011) talks about a need for a paradigm shift within the food industry, away from the old system of closed innovation within the border of the firm, towards a new system of more open innovation. Metaphors as "the valley of death" and "sharing-is-winning" illustrate their perception of the old and the new system. In spite of a growing interest among food industries, the number of companies engaging in open innovation is still scarce (Sarkar and Costa, 2008). According to Saguy (2011), openness cannot simply be wished for: it must be engineered into the new system. The collaboration between industry and research must be facilitated. Someone must take the responsibility of driving the innovation process.

Within the Design Thinking approach the slogan is collaboration, collaboration between different disciplines, collaboration between research and industry, collaboration between industry and market. The aim is to expand the innovation ecosystem and to look for opportunities for co-creation with customers and consumers (Brown, 2008). In the case described here, the project team consisted of researchers, seafood producers, innovation management competent persons, as well as the owner of the project (the member association of seafood producers, NSF). The seafood concepts where developed together with the project owner, not for them. The open innovation project was facilitated by a trained innovation project moderator and stimulation of all the partners creative confidence were an important part of the process.

4   Conclusion

Innovation processes based on how people learn offers new opportunities for the food domain. Design Thinking highlights empathy, insights, observation, rapid prototyping and open innovation as important tools for learning in a product development process. Some initiative always fail, but focusing on experiments for finding errors as quickly as possible, minimizes the cost of failure and hinder large negative surprises close to launch. Rapid learning implies many small "test – improve – re-test steps" conducted in interaction with consumers. Innovation teams develop products with consumers, not for them. They give them prototypes, observe them, talk with them and learn how to improve the product. They formulate hypothesis with expected outcomes, test them, find out what doesn't work and move on to the next learning step. Based on the outcome they adjust the prototype and retest or reject. Design Thinking is a faster and cheaper way to include the voice of the consumer into the process —a learning approach that needs to be discussed, improved and tested out also within the food domain.

Acknowledgement

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