
Designing the Zero Waste Experience

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ABSTRACT:

The conceptual outcome of this research is a design-driven innovation: A concept for a zero waste grocery market that fosters a more sustainable food supply and stimulates an enjoyable user experience. This user experience includes a paradigm shift – from groceries as products to groceries bundled into recipes.

The concept was developed alongside a design process using Design Thinking methodology. Furthermore qualitative interviews with experts, and an interdisciplinary one-day design thinking workshop were initiated and conducted.

1 PROBLEM STATEMENT

Recycling has long been a strategy to overcome the challenge of food packaging waste. But recent studies point out that in the European Union the recycling rate is on average 35 percent and beside that recycling costs a lot of energy, time, and effort [1]. Precycling is one alternative to avoid such enormous waste of resources. The main idea of precycling – if it comes to groceries – is to store the groceries in special bulk containers (so-called gravity bins) and sell them in zero waste markets. This means that the food has no packaging. Thus, there is no packaging waste. Different from supermarkets, customers have to bring their own containers or rent them in the market to fill in the groceries in the amount they need or want.

The superordinate question is whether a grocery market that is based on these zero waste principles can provide a better customer experience than an ordinary supermarket. And if yes, by which measure?

Although there are many reasons for food packaging that made life more convenient for consumers, there are still many unsolved problems – economically as well as ecologically. Especially food waste is a growing problem. On the other hand, due to market saturation, declining product loyalty, reduced length of stay in the store, interchangeability of products (me-too products), and increasing stimulation, the quality of the user experience at the point of sale is of enormous importance. Therefore, the theoretical research focussed on existing zero waste concepts in the grocery market sector as well as on the enhancement of the customer experience in zero waste markets.

2 EMPIRICAL RESEARCH

2.1 Interviews

The aim of the qualitative research was to gain insight in opportunities and barriers for zero waste markets. Based on the literature review an interview guide was developed. Experts from Austria and Germany specialized in food and food markets were interviewed. Concerning the selection of the sample (n=9), the aim was to cover a broad spectrum of expertise in sustainability, food and markets, as well as in consumption and nutrition. All interviews were conducted in a personal setting and lasted between 45 and 60 minutes. The interviews were recorded and transcribed afterwards. The interview guide consisted of predominantly open questions and two exercises that represented a major part of the expert interviews: The first exercise was to imagine a hypothetical scenario of a grocery shopping trip in a zero waste market. The second exercise based on the study initiated by the German Bundesumweltamt and the German Bundesumweltministerium [2]. In each interview eight scenarios were presented that lead to a more

or less sustainable future. All scenarios were presented on separate cards to make it easier for the expert to grasp the content of the scenario at the first glance. The experts had to estimate if the scenario is realistic or desirable or both. Relevant for the further evaluation was the answer both, because this means that this scenario is realistic according to emerging trends in society and also desirable for a sustainable future. The scenarios Organic Commercialization and the Experience Market had by far the most votes by the experts (figure 1). The eighth scenario - Experience Market - was added intentionally. This scenario describes a grocery market that combines a special shopping experience with sustainability. The idea behind this scenario was to find out if experts recognize this scenario as a potential future scenario.

Scenario No.	Description of Future Scenario	Realistic	Desirable	Neither Nor	Both	Not Sure
1	Public Supply	1	2	6	0	0
2	Subsistence Farmer	0	5	3	0	0
3	Farmer's Market	0	5	1	3	0
4	Self-Purchased & Cooked	0	5	0	3	1
5	Organic Commercialization	0	2	0	6	1
6	Food Innovation	5	0	2	1	1
7	Agricultural Import	8	0	1	0	0
8	Experience Market	0	1	0	6	2

Figure 1. Chances & obstacles for zero waste markets

The evaluation of the interviews also showed obvious obstacles for zero waste markets. They are summarized in the following list, as stated by the experts:

- Hygienic considerations
- High personnel costs
- Too complicated shopping process
- Too time-consuming shopping process
- Preservation considerations
- Orientation problems in the market (no brands)
- Missing product information/availability
- Spontaneous shopping not possible
- Difficulty with glass containers
- Scalability of the market for many customers

2.2 Findings

From the expert's perspective a grocery market based on zero waste principles can provide a better experience for the customers. But, especially during the constructed zero waste scenarios, many experts expressed that this new way of shopping would not be that easy to handle for the average consumer. Furthermore, the procedure of purchasing „zero waste groceries“ is too long and too complicated – especially in a world where time is a valuable asset. Furthermore, people are striving for more convenience. Both, opportunities and barriers for a zero waste market, provided the basis for the following innovation workshop.

3 INNOVATION WORKSHOP

According to Bauer & Eagen [3], complex problems cannot be solved with a solely rational and analytical approach. Bauer & Eagen emphasize, that Design Thinking is not just a method to solve problems, but also a method to create something radically new. Therefore, the selected methodology for the workshop was Design Thinking. Participants (n=31) from various disciplines (e.g. engineering, business, design, arts, health, food, politics) took part in the interdisciplinary one-day design thinking workshop. The aim of this workshop was to ideate based on many different perspectives and finally to create rough prototypes of a zero waste market.

In the Design Thinking literature several process models can be found which differ in actuality, abstraction level and maturity. For the innovation workshop the common design thinking process, as developed by the d.school at Stanford, was selected [4]. The main process consists of five iterative steps: empathize, define, ideate, prototype, and test. Because the experimental approach of Design Thinking is derived from typical processes in the early stages of Industrial Design projects, the developed prototypes included persona descriptions, storyboards, prototypes made out of various materials (e.g. paper, wood, metal, cardboard, clay, Lego), but also animations on the computer and role plays. The result of the workshop were six different prototypes for Zero Waste markets, worked out on a conceptual level, with a substantially better user experience compared to existing zero waste markets.

4 CONCEPTUALIZATION

As part of the innovation workshop five key elements were identified, that are crucial for a convenient user experience of a zero waste market concept:

- Product Information Availability (display information on/about the unpackaged product)
- Easy Planning Process (e.g. order by menu and recipe suggestions)
- Experience & Logistics Area (separation of storage and selling)
- Shopping Bag & Grocery Containers (carrying the unpacked groceries)
- Target Groups & Community Building (provide different shopping modes)



Figure 2. Food-As-A-Service process

These five key elements were the guides for the subsequent conceptual service design process. The first step of this design process was the combination and refinement of the concepts that emerged from the innovation workshop.

Derived from the concept of sustainability, the result was the presentation of the entire grocery shopping process as a circular closed system (figure 2). At its core is the customer's desire to get food, respectively meals. In this process food is understood as a service. *Food-As-A-Service* means that groceries are no longer independent units. Additional value is generated when groceries are combined with other groceries resulting in meals of lower and higher complexity. With the support of the Customer Journey Map [5] the convenience mode is shown in detail based on

a concrete customer scenario. This method consists of several types of information that are explained as follows:

- Stages give orientation which tasks of the customer are part of which superior unit.
- Actions are the concrete active and visible parts of the customer.
- Emotions show the internal and invisible parts of the customer. Depending on the situation the customer feels better or worse. Obviously, the goal is to bring the customer in a better mode when interacting with the tool or system.
- Touchpoints are the points when the customer interacts with the designed or observed tool or system.
- Moments of Truth are very critical situations in the whole process. Especially in these situations the customer should be supported by the system or tool or should perceive a special experience that releases positive emotions.
- Personas are prototypical customers extracted out of a target group to simplify the design process.

The following customer journey shows a purchase of a special meal by a female office worker (figure 3).

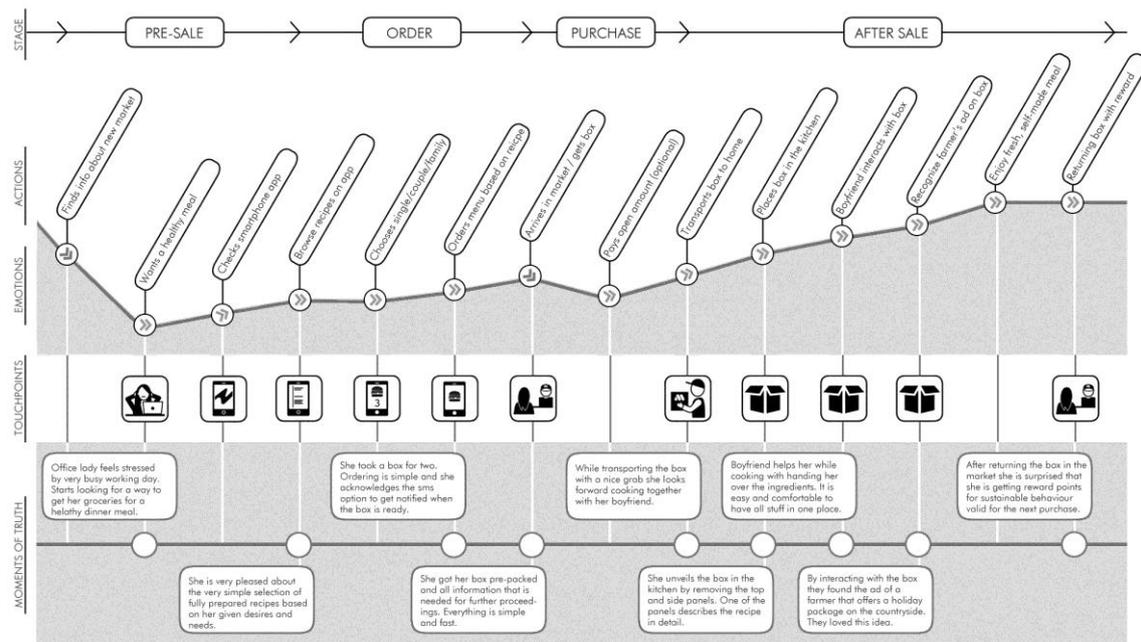


Figure 3. Customer Journey Map

For the further development of the service, the so-called touchpoints were designed more in detail. One crucial artifact of the Purchase- and the After-Sales-Phase of the customer journey is the container to carry the groceries. Therefore, the conceptual design of that “Holistic Box” was part of this research. As an example, the use of that “Holistic Box” in the After-Sales-Phase is explained more in detail:

• **Stage & Actions**

The female office worker transports the box to her flat. In the kitchen she opens the top panel of the box to see all ingredients. The recipe is printed on a side panel. She removes the side panel to use the recipe next to the cooking area. When her boyfriend arrives, she is not finished with the meal. The boyfriend interacts immediately with the box and hands over the missing ingredi-

ents that are still in the box. By chance he recognizes an offer for a holiday package on a farmer's place that delivers the ingredients of the meal to the market.

- Emotions & Moment of Truth

Emotionally the whole interaction with the box is positive, starting with the easy transport to the unwrapping of the box (top and side panels). Each step gives a unique experience that cannot be compared with a supermarket purchase.



Figure 4. Box in action

- Touchpoint: The Box

The box integrates into the kitchen environment as a temporary rack or shelf. For people with only little time left for grocery shopping and irregular mealtimes such a system can replace the inventory holding at home.

The last step of the customer journey is the return of the box and the food containers. Whereas the food containers are part of a deposit system, the box is part of a rewarding system. If the box is returned without damage the customer is honored with bonus credits for the next purchase. A rewarding system is more positive, because sustainable behavior is appreciated, but is not mandatory. As a side effect, customer loyalty can be established, because the customer has to enter the market again to return the box with a chance to buy some groceries again.

5 CONCLUSION AND PROSPECTS

The implementation of zero waste principles leads to a more sustainable grocery market, but is not per se designed for a better customer experience. Within the innovation workshop setting, and in the subsequent service design process, several concepts were developed to increase the customer experience or to tackle known obstacles. Beside the persona-based customer journey map and the cardboard models of the „Holistic Box“, an application prototype (mobile/web technology) was designed.

By ordering via web or mobile technologies and by the bundling of groceries to a recipe box - that is prepacked in the market - the zero waste grocery shopping process can be reduced to only five convenient steps that have to be accomplished by the customer. The designed service design model (Food-As-A-Service) can be boiled down to the following formula: Zero Waste + Technology + Recipe Bundling = Improved Customer Experience.

In the context of this research the final product concept design including the online services, the *Holistic Box*, and the new convenient zero waste grocery shopping process has not been tested with users. For future research usability tests of the prototypes presented in this paper are a potential field of interest. Furthermore, another field of interest will be a quantitative research, if zero waste grocery markets that implement the presented concept achieve a higher degree of customer experience compared to ordinary supermarkets with traditional packaged goods.

In the course of this work a startup – *holis market* - was founded. The startup will implement the conceptual service design prototype presented in this research paper.

LITERATURE

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