

# Understanding users in product development.

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## Abstract

The consumers expect the packaging to be functional and to fulfil their specific needs in every way. A Danish survey showed that at least 40 per cent experience difficulties, when handling and opening packaging at least once a month, and as a consequence, 16 per cent of the consumers refuse to buy the product next time they go shopping [1]. The issues are worsening due to the expansion of the elderly population in the upcoming decades all over the world. In Denmark the amount of people in the age more than 65 years old will rise to index 170 in 2050 compared to 2010 [2]. It is also noticeable that 680,000 people in Denmark have difficulties and feel pain using their hands, which account for 17 per cent of the adult population [3]. Therefore, the chance of excluding a part of an enterprise's target group is very likely, making easy-to-open packaging more relevant than ever.

The project "User-driven Guideline for the Industry: Accessible Packaging for Elderly and Disabled" seeks to address these issues. The main deliverable is a web-based guideline. The guideline contain collected knowledge regarding the attitudes of the consumers and issues to address about packaging design, also, the guideline contain a step by step process to develop easy-to-open packaging. The guideline is constructed in a way that allows the enterprise to pick and choose in respect to the enterprise's needs and competences. The main focus in the development of the guidelines has been to produce a tool that function in a practical manner instead of communicating the absolute scientific truth.

The paper outlines, the user-centred approach taken to address better packaging design and explores the potentialities to deliver innovation from the user's perspective.

A concrete case from Tulip Food Company shows that video observations is a tool for user understanding and that the first step towards better packaging, goes through consensus in the organization regarding the need for more easy-opening packaging.

**Keywords:** *User Friendly packaging, User research, Inclusive design*

## The importance of easy-to-open packaging

Many manufacturing enterprises are poised between the interests of consumers and business requirements when it comes to designing packaging. On the one hand, it should be easy to open packages, boxes and cartons, for there is no advantage in irritating customers by making it difficult to get to the product. On the other hand, it can be expensive to design new types of packaging. Development is costly and the solution may require the consumption of more materials for new packaging. This affects the price, which in turn may damage the enterprise's competitiveness. However, many aspects speak for easy-to-open packaging.

## Registration of accidents

One of the consequences of unmanageable packaging is that consumers are cutting themselves. Table 1 below provides a breakdown of the incidences of packaging-related accidents by life cycle stage of the packaging within in the household [4]. 75 per cent of all after-use accidents occur between the ages of 1 and 24, with men being 30 per cent more accident-prone than women. Two main packaging types are dominant in the incidences of after-use accidents. These are glass bottles and food cans.

The number of domestic accidents with food packaging and tools account for 2,500 accidents in Denmark (European Home and Leisure Accident Surveillance System, 1996) based on registration at the accident and emergency department. If all packed goods are included the number is doubled, and this is only accidents which cause serious injuries as people visit the emergency department.

Life cycle stage	Number of accidents #	Percentage of total accidents
Initial opening	26,000	39
re-opening	15,000	22
after-use*	26,000	39
<b>Total</b>	<b>67,000</b>	<b>100</b>

**Table 1** Packaging-related accidents by life cycle stage in UK (1994) [4]

*Source: Previous DTI packaging research conducted by Metra Martech*

*\* After-use accidents refer to all accidents occurring after the package and contents have been used*

*# Number of accidents refers to the number of people reported to accident and emergency units*

## Size of target group

The problems with unmanageable packaging are mainly addressed to elderly and disabled, and all over the world these groups are drastically expanding. In Denmark the amount of people in the age more than 65 years old will rise to index 170 in 2050 compared to 2010, which account for 490,000 more elderly people [2]. It is also noticeable that 680,000 people in Denmark [3] have difficulties and feel pain using their hands, which account for 17 per cent of the adult population. These difficulties mean that roughly 50 per cent of this group experience problems with managing packaging on a daily basis.

For people with rheumatism almost all experience problems. However, the problematic does not only apply for elderly and disabled. A Danish survey [1] showed that almost every one experience problems from time to time and at least 40 per cent of the population experience difficulties, when handling and opening packaging at least once a month.

In Denmark it is a key to the vision of the age-integrated society, and when people experience either a major or a minor loss of performance, that they remain independent and not dependent on assistance, so they can stay in their own homes as long as possible. This calls for design and technical solutions of everyday technology, aids and appliances.

## The economic aspect

Not only can packaging design encourage people to buy, it may also keep people from buying. A Danish survey [1] showed that, due to the consumers experiences with packaging, 16 per cent of the consumers refuse to buy a product next time they go shopping. The Consumer Agency's report "Design for all" shows, that easy-to-use design has a positive effect on both turnover and profits. This is also confirmed in interviews with Danish supermarkets [5]. The study showed that the consumers are willing to pay 10 per cent extra for convenience packaging.

This being said it is also worth noticing that in Denmark people aged more than 50 years old own 70 per cent of the capital and have 40-50 per cent of the buying power [6]. Keeping this

in mind, it is surprisingly that only 5 per cent of the marketing budget covers this target group. By addressing this group with easy-to-open packaging one would at the same time make sure that other age groups would also get easy-to-open packaging.

### **Theoretical background**

The consumers expect the packaging to be functional and to fulfil their specific needs in every way. Apart from Orth & Malkewiwitz's (2008) and Hestad's (2007) studies [7,8], there are not many qualitative and holistic approaches to packaging design. The majority of the existing research is based on quantitative surveys or eye-tracking studies, and therefore leaves out the questions such as "What are the needs and preferences for package design from product user perspective?" As package design spokesmen Gerstman & Meyers (2005) and Young (2004) suggest [9,10], there is need for more qualitative understanding of packaging.

The project "On a Plate: making food packaging easier to use" [11], contains design research that aims to encourage innovation in the field of food packaging. It is based on the fact that there is growing frustration among consumers that packs are difficult to open and on the belated recognition among packaging producers that new designs should be more intuitively usable in form. The insights from the video ethnographic research formed the basis for a design tool. The cycle of consumer interactions with the product is represented graphically in 24 segments, from shopping to disposal. Each segment represents a design consideration focused on the consumer.

### **Research Methods**

Bannon [12], points out that there is a need to see people as actors in situations, to seek new ways of understanding of the relationship between people and products. Dishmann [13], points out that observing real people in real contexts is a critical complement to asking, to help identify patterns and extremes of behavior, unarticulated needs, and places where peoples actions and stories about what they do differ in important ways. In this research project we have looked at the human factors such as strength and power needed to open the packaging. Additionally, we looked at users as Actors, studied how and why they open the packaging as they do. To understand the context of the meaning that the users ascribe to the product or service and to focus on possible gaps between what is said and what is done. The design researchers have been using interviews, focus groups and video recordings to study how various user groups perceive various types of packaging. To obtain a detailed knowledge of the user and use of the product, video recording was used to observe specific activities associated with the use of the product. Video was also used to gain insight into the broader consumer context i.e. the physical, cognitive, social, emotional and cultural aspects associated with the purchase and use.

### **Questionnaire**

Consumer attitudes to user friendly packaging were examined through a questionnaire survey. The study included 285 people, half of whom had a disability and the other half were healthy people. This basis has been chosen in order to determine how widespread the attitude is in the general population and whether the problems in question are relevant "for the old and sick only".

Consumers were asked if they look for easy packaging when shopping. The chart shows, not surprisingly, those who have most problems with packaging also are those who are most motivated to buy products with user-friendly packaging. 80% of the most vulnerable group deselected bad packaging when choosing products. This group is not insignificant! This should

be compared with that population in Denmark becomes older and older, and more than 700,000 people have arthritis-related illness.

The most frequent causes for problems with opening the packaging is that the package requires too much effort to open and / or opening possibilities have too little to address. It is particularly common for those who daily or weekly experiencing problems.

It is interesting that a major cause of problems for all consumers is that they do not know how the package should be opened (possibly due to poor graphics and instruction).

### **Mechanical and Physical strength**

Beside a questionnaire survey a Danish group (29 males and females, 60-90 years old) were asked to open and to evaluate the easiness of a can. This showed that 70 % judged the pack as easy to open, while 10 % were not able to open the pack at all. Scaled up, this means that 120,000 individuals in Denmark (total population is 5 mill.), as a guideline, have difficulties in opening the can.

Mechanical test was used in connection with strength measurements of consumers.

The research was centered on understanding the correlation between mechanical opening strengths, physical strengths of a population of people and the actual conducted user evaluations of a given product

The use of this study is to guide the company to point out the range of difficulties for a certain target group, but only if the problem is concerned about lack of strengths to open. Video ethnographic studies, however, provide an overall view of the sources of the problems with opening packaging.

### **Understanding key issues to problems**

If one seek to solve the consumer's problems with packaging it is important to recognise that the problems arise due to different nature of the problem itself. Problems related to opening of packaging can be divided into three categories:

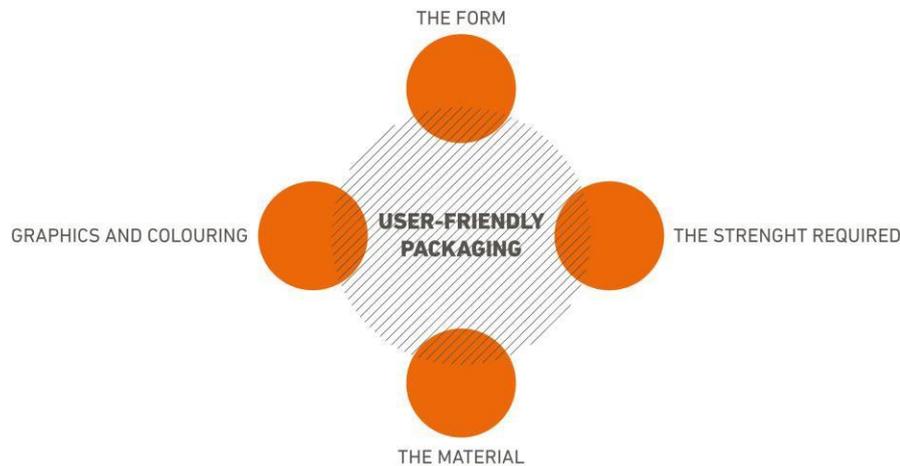
1. Visibility of opening mechanism
2. Cognitive issues
3. Physical strengths and delicate motor abilities

The categories are sorted hierarchy, meaning that the consumers should, first of all, be able to identify the position of the opening mechanism, then, to understand how to open the packaging and, finally, be able to grip and apply the required force in order to open the packaging successfully. If any of these tasks are not meet, the consumer will very likely experience problems with accessing the product inside the pack. The insights from the video ethnographic research can be used to evaluate the nature of the problems in each case.



## Analysis of packaging elements

Understanding the nature of the problems is the starting point to solve the problems. Investigation of the existing packaging will bring about an understanding of how the package could be improved in a practical manner.



Areas of priority:

- The form
  - The design should clearly tell the consumer how the product should be used and opened.
- Graphics and colouring
  - Use graphics and colours to clarify the opening mechanism on the packaging.
- The material
  - Use the material to improve grip-ability
- The physical strength required
  - Use mechanical tests to see how much effort a consumers must apply to open a package

## Case – Tulip Food Company, Pålækker

Five development projects have been started within the project in order to produce practical knowledge in how to use the guideline in practice. One of the companies participating was Tulip Food Company. The case report is shown below:

### Aim

The aim of the project was to re-launch the product known as Pålækker and that Pålækker should gain a leading role in the sliced cold meat category. Tulip, furthermore, wanted to achieve an increase in loyal consumers of 3 per cent (from 12 -15 per cent).

### Gathering insight and research

The preliminary work consisted in analysing which of the competing products Tulip would gain the most from testing in comparison with the existing type of packaging: Pålækker.

Tested packaging types (Figure 1):

1. Bordpak Pålækker, manufactured by Tulip: hard plastic bottom and hard plastic top, click seal lid with knob
2. Bordpak Budget: hard plastic bottom and soft plastic top
3. Bordpak: hard plastic bottom and hard plastic top, click seal lid without knob



**Figure 1** Three types of packaging were selected for testing.

## Mechanical testing

On a previous occasion the Danish Technological Institute had measured the mechanical force necessary for opening Pålækker in order to assess whether the force used for opening the packaging was a critical parameter for the target group of Tulip. The mechanical test showed that the force necessary for opening the packaging was low (measured as 9 N based on 10 items) - 95 per cent of all users without any particular disabilities aged between 10 and 80 could easily open it.

## Observations of users

The three packaging types were tested in a user-based study. It is important for Tulip that everyone, including the aged, who generally have less powerful hands and fingers, is able to open the packaging of their products. For this reason the users participating in the user survey consisted of young as well as old people, with and without physical ailments.

The user survey was intended to give Tulip a basic understanding of problem areas in existing packaging as well as an insight into other opportunities for development. Furthermore, the user survey also provided Tulip with an insight into the attitudes of various users toward different packaging types.

Plan for the testing: test subjects were asked to open and re-seal packaging. They were asked to think aloud while doing so and to look for instructions and other guidance on the packaging *before* opening the packaging.

## Workshop and ideas generation

Tulip had gathered employees from the entire organisation in order for them to participate in a day of workshops. In the course of the workshop, videos recorded during the user study were analysed. In the following we have gathered the insights identified on this day.

### Insights from the user survey

- Re-seal is important - users expect to be able to store cold sliced meat in the packaging after opening it.
- Re-seal ensures that the product will appear "exciting" after the first day it has been opened.
- The size of flaps on the packaging should be increased (in particular in the upper layer).
- The choice of material is very important (a hard material is better!)
- Make sure that the joints on the top part of the packaging are not too hard, as this makes the packaging unnecessarily difficult to open.

- It is important that the opening is clearly visible.
- A rough/granulated surface makes getting a grip easier
- It may be a good idea to attach a ring to the opening
- A mechanism which ensures the separation of flaps should be attached

#### Ideas/focus from the workshop

During the workshop, in which employees from different Tulip departments participated along with packaging suppliers and an advertising agency, it was, among other things, noted that:

- Consumers rarely read instructions; the opening mechanism, consequently, has to be clearly visible.
- Consumers are prejudiced with regard to packaging types according to their own experience.

During the workshop different ideas for new packaging types were generated. You can see photos from the workshop below (Figure 2). It has been very important for Tulip to preserve the tray-based solution, as is evident from the proposals below. The different ideas incorporate different flap and ring-based solutions which utilise different materials and for which the flap/ring can be bent and pulled. Furthermore, different design solutions for the tray itself were suggested in order to make the location of the opening mechanism more obvious and to allow the consumer to get a better grip on the flap.



**Figure 2** Illustration of the prototype formation made at the workshop at Tulip

#### Concept development and prototypes

In June 2008, in connection with the development of the packaging, Tulip, aided by Research Int., carried out an analysis of the key drivers of purchase. This study showed that "product display" is the most important factor, indexed at 100, while "useful for storage" indexed at 70, and "easy to close" and "easy to open" indexed at respectively 64 and 54.

For this reason, packaging development has been focusing on the aforementioned parameters. After ideas generation during the workshop, Tulip has continued their work on the new type of packaging; the central point being the development of a type of packaging with larger flaps which will make it easier to get a good grip on the packaging. Although the mechanical test showed that the packaging requires slightly more force to open (13 N based on 10 items) the consumer can transfer greater force due to improved grip. The knob in the packaging ensures that the consumer is able to separate flaps without using his or her nails. Furthermore, consumers can open the packaging from two corners instead of one. The new type of packaging is shown below.

#### The result

Based on this process, Tulip has, in week 47 of 2011, launched the product Pålækker in a new type of packaging for cold sliced meats with larger flaps (Figure 3). This packaging must provide the best possible protection during transport, storing and when it is stored by the

consumer. At the same time, the packaging should differentiate the product and offer convenience to the consumer, including ease of opening and presentation when the product is served in the packaging type meant to be placed on the table.

In addition to the direct result: a new type of packaging, Tulip has, furthermore, gained a better understanding of the various considerations which are necessary for developing new types of packaging. Video-taped observations, in particular, proved to be effective tools for increasing the understanding of the user's behaviour and needs. The process has also created a higher degree of cohesion between the different departments of the company. This has been important as Tulip is a large company characterised by a high degree of efficiency. The process has, consequently, increased the internal cohesion of the company and created a better understanding of the objectives and motivations of different departments.



**Figure 3** Illustration of the final packaging design for Tulip Pålækker

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