This paper was presented at the Pharmaceutical & Medical Packaging conference 2007 together with my colleague, Signe Lagoni.

Developing New Concepts Based on End-User Understanding

User-centered innovation sets the customer or the user as the starting point for the innovation process in order to differentiate from the competitors through uniqueness in value proposition, as experienced by the user. This paper describes a systematic approach for user-centered innovation, based on experiences from device and packaging innovation at Novo Nordisk.

We shall first address three questions:

1. Why should we engage in user-centered innovation?
2. How can user-centered innovation be practiced?
3. Who should be involved?

The methodology is then described through a real-life case.

1. Why should we engage in user-centered innovation?

"Radical innovators learn to live inside the customer's skin. Innovation almost never comes from an articulated need; it comes from an insight into an unarticulated need."
– Gary Hamel in "Leading the Revolution".

The core of the "why" is that you cannot just walk out and ask your customers what they want from your products – at least, if you do so, you only get very obvious answers, since they respond based on their experiences from the existing range of products. They might come up with proposals for minor improvements, but if you aim for taking a big leap in innovation, it's not that easy. Instead of asking the customers, you need a systematic way of getting "under the skin" of the users. This is where user-centered innovation comes in, as a systematic and analytical approach.
In user-centered innovation, the company is leading the innovation process – as opposite to Lead User innovation, where the user is in charge. User-centered innovation is characterized by the systematic search for unmet user needs at the starting point for innovation.

2. How can user-centered innovation be practiced?

User-centered innovation of course starts in the field, visiting customers. It's like being a detective visiting 'the scene of crime'. The development team must go out and sense for themselves what it is

like e.g. to live with diabetes. As Louise, one of our development engineers puts it: "*You can't just read an analysis. There are so many things you only understand by being there yourself*".

Of course the whole development team cannot walk into the private life of a user; that would be too intruding. Therefore recording what you see is very important. The strongest way of recording is video. Coming home with a video makes it possible for the rest of the development team to have the feeling of being close to the user, without having been there – the only thing you don't capture with a video is the smell from the kitchen (or from the dog).

In general, the work with user-centered innovation unfolds through three main stages:

1. Collecting and categorizing data on end-user statements and behaviors
2. Analyzing and interpreting the data into identification of unmet needs, Desired Outcomes or wishes for product improvements
3. Concluding into user requirements for the development project.

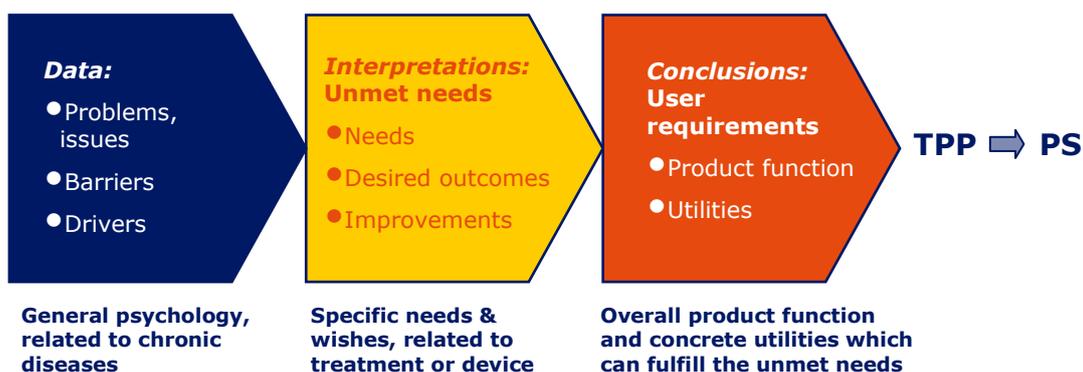These stages are mapped in the figure below:

Figure 1: Stages in user-centered innovation. TPP = Target Product profile. PS = Product specification

3. Who should be involved?

There's no doubt that every person working with product development should participate in user-centered innovation, so that everybody gets a chance of '*living inside the customer's skin*'. In our case at Novo Nordisk, this first of all means our development engineers.

Of course Marketing should participate. It's their responsibility to describe the market and the needs. Marketing might be skeptical about this new approach – will we interfere with their job? – But we have succeeded in gaining a mutual understanding of the value of this qualitative approach for the early stages of a development project, leading to later quantitative Market Research, which is then carried out by Marketing.

Even the qualitative research is not exact science, you need some kind of process experts. At Novo Nordisk, we collaborate with Center for User-Centered Design at Mads Clausen Institute. They send

us students, who work with us for half a year and make their master thesis, using us as a case, providing us with the tools and methods from the Institute.

During the years, we have built up quite some in-house competence, so that some of us can work as process consultants. – Also, from time to time, we co-operate with external consultants.

4. Case from Novo Nordisk device and packaging innovation

In our presentation we show the process of an actual combined device and packaging development project – from the early phase, the early investigations, before any real Market Research was made. It's a very comprehensive process, and of course you needn't unfold the entire methodology in every development project. But in this case, we were entering so to speak some white areas of our world map, and therefore we set for a very thorough approach, where we used a lot of tools to build up our customer understanding. In the case, we followed our general approach of data collection, data analysis and conclusion into user requirements.

In the **data collection**, we studied the literature to see, if there were articles covering our topic, and we examined, if there was existing Market Research studies containing results that were relevant for our purpose. And furthermore, we went out to the field and interviewed app. 20 users in 4 countries. The interviews were recorded on video and notes were taken. To support the empathic methodology of user-centered innovation, nurses were interviewed in hospital settings, while patients were interviewed in their homes.

The **data analysis** is crucial. Coming home from the interviews with the video or your written notes, the next thing is to analyze thoroughly what happened. If you jump directly to conclusions, you are most likely to conclude your own favorite assumptions, your own 'hobby horses'. Instead, a team of persons sits around the table and analyzes what happens, and what is being said at the videos, statement for statement and observation for observation. It's time-consuming, but this is how the systematic approach really makes a difference.

The recorded videos were analyzed to identify barriers to the prescribed treatment, to identify a set of behavior variables, and to describe a timeline of user actions. This again was used to see if there were any patterns in the behavior variables – and from this analysis we described some user archetypes. The archetypes were of different age, since we concluded that some important behavior patterns were lifecycle dependent. We also described some typical user situations, and concluded that there were some corresponding typical user needs, depending on the situation.

During this case we developed our own tool for capturing unarticulated and articulated user needs. We call it '*Desired Outcome Analysis*', inspired by Anthony Ulwick. We capture and analyze the material from our interviews in a 3 column schema.

Pro process is such:

1. In the left column, you note the actual behavior or the actual statements, like here "*It takes less than 2 minutes – but it is a psychological barrier – should I do it or not? – it is something unexplainable…*" and "*There is no reason that I should be reminded all the time that I have diabetes. I don't want a yellow bucket at home filled with used needles…*". This column represents objective data, either exact statements or observations.

2. In the middle column, we interpret what might lay behind the behavior or the statements. In this case: "*Interrupting your daily life is a psychological barrier (as he says himself) - like a wall between two worlds (normal life and diseased life). Crossing this canyon is painful because it reminds you of your "shadow life"* ", and "*Physical space implies Mental space. People wish to forget about the disease*". So, this column is not objective – we, as a team, interpret socio-psychological motives behind the statements, using our knowledge on diabetes and psychology and our understanding of the context – the personality of the person and his overall situation.

3. In the right column, we conclude into some so-called '*desired outcomes*' – that is, what the product should ultimately do for the user, if it should respond to the described interpretations. Like here: "*No treatment needed (as the ultimate liberation) - or a treatment procedure of only a few seconds*" and "*Design should signal normality, not illness*".

Of course this method is not exact science. But it's a lot better than making your intuitive conclusions without a systematic approach. And it also provides traceability – you always can track the foundation of your user requirements.

As a **conclusion**, the Desired Outcomes are 'translated' into user requirements for the new device-packaging solution. The only difference between Desired Outcomes and user requirements is that a "user requirement" is linked to project governance, so you can say it's taking the Desired Outcome a step further – e.g., you may have identified many Desired Outcomes, but only some of these are set as user requirements for the project. These are then formulated as desired product functions and utilities.

The qualitative methodology described in this paper is most valuable for early development phases, contributing to the aspiration setting of the concept development. In the case example, it was followed by a traditional Market Research, to verify the early conclusions. But the outcome of the

above described process will also help the development team to better generate, evaluate, and select the best ideas and thereby sat the project targets - all through the development project.

To use a systematic approach to involve the users in the early development phases will, based on our experience, increase the accuracy of a resulting product/packaging, which is unique in value proposition as experienced by the user.