# The Reality of Unreal Customer Models
## Lessons in Corporate Design Research

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**Abstract**: In this paper we discuss the unique challenges of design research within a corporate framework and the opportunities to influence product direction and position design to its best advantage. As in any corporation, there is an ongoing effort to keep the focus on their customers. Determining a customer's needs involves multiple methods of research and a consistent discipline to discover the customers "real" needs. The needs can develop as a result of process observation, focused discussion with the customers and product users as well as organizational learning. Creating 'customer models' that accurately reflect the future needs of their businesses is not a simple task. This is particularly challenging in technology-centered companies where the comfort level is around inventing and improving electrical-mechanical performance. Without a focused research effort, well-meaning individuals can perpetuate "unreal" customer models based on anecdotal information, all in an effort to think, "customer first". Customers can take on a distant unreal quality as the recipients of the company's technology efforts rather than partners in a solution. We refer to these as "unreal customer models". We will discuss our process and how we avoid unreal customer models. We will also demonstrate through a current product example where we were successful in avoiding unreal customer models and identified real customer issues.

*Key words: real, unreal, customer models, users, research process*

## 1. Introduction

We make business-to-business products. Unlike consumer products which may reflect trend and desire as much as functionality, our products are business critical -- important tools in our customers' business processes. Without deep, involved and consistent customer research it is easy to develop a false or unreal view of customer needs. We refer to any particular view of the customer needs as their "customer model." If the organization's customer model is not validated through ongoing research it can take on an inaccurate impression leading to misinformed product decisions. If a company has had a successful product or feel expert in the relevant area of technology it is easy for them to assume that they have all the information needed about this customer. In addition, anecdotal information gathered by periodic customer meetings over time can create an unreal profile of customer needs. This is especially true, if those interviews are only with the same members of the customer's management team. Confidence in technology can lead a team to assume that the technology is key to the customer's success. Confidence in a successful product can lead to incremental improvement that doesn't address emerging issues.  Strong team leaders who are motivated to get the project moving, can set product direction based on these unreal customer models. Any of these assumptions can lead to the development of a product that misses the market need.

When it comes to business, real customers don't care about or desire your product. They only care about their business and what you are going to do to make it successful. If the product doesn't fit or improve their business processes then they are not interested.  They have to see the return on investment. Innovating around the product technology and design is great, but may be limiting. Innovating around your customers business is critical. And to do so requires real customer modeling.

## 2. Research for Customer Models

### 2.1 How we avoid unreal customer models

We talk to a lot of customers and their business partners. Whenever we are able, we observe the customers and users in practice and listen to their interpretation of their concerns.  We record their responses and our observations and later, validate our findings.  Real customer modeling requires the researcher to take the raw input from the customer and understand the underlying issues and needs. Customers and users may

give you an answer to their problem but as a researcher you must seek out the underlying issues that are

driving their thinking.  Their answer to the problem is probably based on what they know or what is

expedient in their situation. Taking the customers answer verbatim, but not understanding what they are

really trying to communicate leads to unreal customer models.

In 2007 our team of design researchers visited 133 customers and partners. In 2008 we visited 149

customers and partners. This research spanned a number of ongoing product development efforts and

included interviews with operations and information technology (IT) management as well as end users. We

conducted open brainstorming sessions, observational research, and validation reviews.


## 2.2 A brief description of our research process

Our Design Research team includes experts in Human Factors, Market Research, Industrial Design,

Psychology and Design Research. The research we conduct is structured into four areas:

**Baseline Research – What do we already know?**

Internal expert interviews, Competitive research, Current product evaluations

**Generative Research – How can we drive innovation?**

Observational research to understand customer business operations and opportunities to innovate

**Product Definition – What is the right product fit?**

Defining the right features and functionality before committing to development

**Validation – How do we maintain a customer focus?**

The goal is to maintain the design intent throughout the development process


**Baseline Research**

Before customer or partner visits are organized, we first ensure we know the existing issues by interviewing

industry and technology experts within our own organization.  We recognize the fact that there is

substantive organizational learning within the company that should be considered.  It may be anecdotal, but

from this we can build a picture of the existing customer models held by the organization.  Our subsequent

research will help to correct and update our organization's customer model. It will also level set the

research and allow us to test out assumptions about our customer's expectations.

Customer visit preparation is also an important part of this phase. The visits are organized and conducted by the design researcher in coordination with account managers.   Based on our interviews with internal industry experts, a variety of customers and partners are identified for the research effort.

**Generative Research**

Generative research is about looking for the opportunities to innovate by understanding how the customer runs their business. We avoid discussing the potential design of the device itself but instead focus on the business processes. Interviews are conducted with information technology (IT) development teams (who are often responsible for purchase decisions) and more importantly, operations management teams (who understand the business processes).

They could have differing views of their own operations.

Time is scheduled with users and task managers to conduct direct observational research. This may include facility tours, with time to observe operations, questions to users and managers, and if possible ride-alongs or job shadowing. The observational research is critical to describing the customer's business operations in detail and is documented as carefully as possible.  Often it is easier to observe a usage problem than to explain it.  For example, if a device is designed for interactions between retail employees and customers, it is important to understand the expectations of the interaction for both participants and experience as much as possible, how the device is used.

The design researchers document descriptions of environments, users, task flow, responsibilities, timelines, and product issues. The variety of business operations researched are extensive and span a number of industry verticals. They include receiving operations, delivery, sorting, inventory management, re-stocking, loading, task management, customer relationship management, point of sale, and others.

**Product Definition Research Visits**

The Product Definition phase helps the team clearly define, and test the right product fit before there is a commitment to development. This is the preparation for the Market Requirements Document (MRD). Our research team works very closely with marketing to identify the right features and functionality for the product. Based on the first round of customer visits and generative research, the team will identify specific customers to make return visits to during the Product Definition phase. The researchers will often use product mock-ups that facilitate a discussion around what features and functionality should be in the final product. This research ensures that the product we are planning to develop is the right product for the market. It also allows key customers to participate in the definition of requirements without dictating the final direction.

**Validation Research Visits**

This phase is critical to ensuring that we stay on track while designing the product. We consistently ask ourselves, "Does this truly meet the customer's needs?" During the course of the development program, there will be further visits with several key customers to validate the integrity of the gathered information, product direction, and development trade-offs. This ensures that as the product development progresses, the design remains targeted on the customers needs.

These real customer models are more than just how end-users use a product but why the product is essential to the company's business success. The product, itself, is one tool used to accomplish a business process (sorting, loading, inventory management, point of sale, personal shopping, etc.). If you understand how the tool is used, you can improve the ergonomics or appearance. If you understand the sorting process you can innovate around the entire process.

To describe the power of this research process and how it helps determined REAL from UNREAL customer business models we would like share a recent product development success story. The program is a good example of how our understanding of the customer's real business processes informed our team's innovation.

## 2.3 Rugged Mobile Computing (MC9500)

Motorola's MC9000 products were the best selling products in their category for the previous six years when the company decided to start development of the next generation. The original MC9000 products were heavily ruggedized mobile computers designed for data capture and computing in harsh environments. They are still used everywhere from retailing to oil refineries. Improving on such a successful product was going to be difficult. Competitive products were beginning to approach the quality and functionality of the MC9000 product. Technology was also improving but this could be addressed by incremental improvements that did not necessarily demand a new product.

The design team wanted the product to set a new standard for the category just as the original MC9000 had. We knew there were opportunities to make improvements in the design but we wanted to step beyond innovating around the physical product itself. We wanted to innovate around our customers' business processes. We wanted to create customer models that were based on in-depth research and a deep understanding of what is really important to our customers, even if they did not know how to present this to us. In order to do that we met with a lot of customers, over a six month period to understand how they ran their businesses processes, identify their "pain-points", and look for opportunities to improve.

We began with internal stakeholder meetings to discover what other management team members understood based on their customer interactions. This was an effort to level set the organizations learning from the original MC9000 product successes and failures. This is also where a lot of past research ended. The view of the customer was limited by what was already known from past experience and focused more on what the engineering team knew about relevant technology advancements. Without further research the team would have improved on the technology without really addressing the customers evolving business needs. This would quickly lead to an unreal view of customers needs by assuming that they wanted our product and our technology, and would pay for it if we would just technically improve the current product.

Instead we followed this internal research inventory with extensive customer research across a number of industry verticals. As the research progressed we identified the best business opportunities and identified

key customers to validate our ideas with as development progressed.

There were two focuses on innovation, the device itself and the accessories that customize the product for it's specific use case. On past projects the majority of the innovation effort was spent on the device. Accessories that related to management and deployment issues were developed later. On this new product, the research quickly told us that deployment and device management were just as critical to our customers. Batteries for example were a major issue. Previous research had always told us that customers wanted bigger batteries to ensure they would always have enough battery life to last a full shift. This had become an unreal customer model that had driven decisions on past programs. Our updated research told us that bigger batteries were not the real issue. Because the original MC9000 products had lasted so long in the market there were still many batteries that were past their effective use life. As users picked up batteries out of bins before they began their shifts, they had no way of knowing whether they had a new battery or an old battery. There was no way to tell them apart. There was also no way to tell whether batteries were properly charged. Delivery drivers who were heading out for a day on their route needed to be assured that they were getting a battery that would last the full shift. The answer was to develop a battery gauge that indicated state of charge as well as whether the battery was near end of life or not. Customers themselves would be able to set their own 'end of life' criteria and more effectively decide how they wanted to manage their batteries.

Given the number of use case scenarios that the product needed to fit it would have to be incredibly flexible in order to accommodate a variety of accessories specific to different customer applications. This category of product needed to accommodate different size keypads for various customer applications, or other attachments like magnetic stripe readers for retail applications. The devices were typically charged by placing them in a cradle that captured the bottom keypad portion of the product. This limited the options for keypad size and layout. It also meant that attached accessories needed to be connected through the charge/communications connector at the bottom of the unit. In addition, the device would need to fit into the charging cradle with the accessory attached. This meant the accessory needed to include a charging pass through and needed to fit into the cradle. The cradling methodology employed by all our devices as well as

our competitors devices severely restricted what could be done with the form of the product and limited the keypad variations to a specific size. No one had thought beyond the cradling option. It was simply a necessary part of charging. It was also an unreal customer model that needed to be challenged.

The answer was to move the charge/communications connector to the back of the device instead of the bottom. The device now hung on the charger like a phone receiver instead of slotting into a form fitting charging stand. Putting the charge/communications connection of the back was a major innovation. It no longer limited what you could do with the form of the device. In fact using the same charging configuration you could now mount a variety of products on the same charging solution.

Using the charging hook configuration also allowed designers to provide a greater variety of keypads to customers. Now that the form was not restricted by the size of the charging cradle we could offer wider keypad for easy keying or narrower keypads for better grip.

Previous research focused primarily on the device and technology. During this research effort the team identified that re-building the backroom charging area after the purchase of a new product was a major customer pain point. A customer might have 40 -60 devices in charging stations in the backroom of a depot. Consider a major shipping company. The cost of building shelves and racks in every depot around the world to accommodate a new mobile computer was a costly and painful issue. With this new design the team future-proofed the backroom. The hook charging form will allow future Motorola engineering teams the ability to create new products in this category without changing the charging solution. Customers can retrofit other existing products to fit into the hook charging form and can add accessories like batteries and printers into the same rack system. It is a cost-efficient and progressive solution to the customer's critical space and charging problems.

The new product or MC9500 as it is now called, is a major step forward in its technical design but also in how it and it's eco-system of accessories fit with the way our customers work.

## 2.5 Organizational Learning

Communicating and updating real customer models throughout the organization is an ongoing issue. Product development teams are formed and then disband as products reach market. The organizational learning that is gathered and analyzed during the course of that product development is often lost with time unless individuals remember and can still access the correct files. This cycle of moving teams from development to development can perpetuate the issue of UNREAL customer models.

Our organization needed a process for capturing this organizational learning and making it easily accessible to design, marketing and engineering teams.  We set out to address the question, "How can we better gather, catalogue, and communicate our understanding of our customer models?"

To address the need to consolidate research data, in 2007 the industrial design group established an on-line database, the 'Customer Intelligence Database' (CID). CID is the key tool in documenting our understanding of our customers. In addition, CID streamlines the sharing of information among our internal development teams and saves resources by reducing redundancies in information gathering.

Access to this information has been invaluable to the development teams who can now cite specific customer behavior and show detailed examples. On a more secure level of CID, design researchers have access to a database of past research and analysis: including competitive research, subject matter expert interviews, product definition research or validation testing results. The site now ensures an ongoing capture of organizational knowledge and a demonstration of the changing requirements of our customers.

Currently, CID profiles 173 customers through 225 visit reports and 737 photos and videos. The site clearly documents our understanding of our customer's business operations and ensures that this knowledge easily accessible to all development team members

## 4. Conclusions

Through our research focus on customer business modeling we have established the organization's center of customer knowledge within the heart of the 'Innovation, Design and Research' group. Our research defines the features and functionality of future products and we are now in a position to drive product development decisions on key programs. This is all based our understanding of various customer business models. The MC9500 program is an excellent example of how a design and research team influenced the direction of a major technology product.

Through our close work with account teams, partners and customers, the design research team members are now considered subject matter experts and trusted advisors with a number of key customers. As part of an ongoing effort, we are in continuous consultation with customers and partners to ensure that we always have current REAL customer models. Our ability to focus on and resolve REAL customer/user product issues is now key to our corporate value.