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Design Research as Strategic Asset

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The Challenge

Many corporate industrial design groups lack influence over product development decisions. Yet, industrial design's ability to focus on, and resolve customer and user product issues should make it a significant corporate asset. The key is to become the focal point of customer knowledge. This knowledge needs to be based on a deep understanding of who the customer is and what drives their business needs and operations. It is not enough for industrial design teams to say that we represent the customer or end user. We need to act on our belief and use our knowledge and understanding to drive product development direction.

Understanding our customer's business operations is an important part of our ability to develop innovative customer-focused solutions. The design team actively works with account managers and industry specialists to develop customer and partner visit relationships that are beneficial to both the customers and the development teams.

That understanding is more than just how one uses 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 such as, sorting, loading, inventory management, point of sale, and personal shopping. If you understand how the tool is used, you can improve the ergonomics or appearance. If you understand the business drivers, you can innovate around the entire process.

With this research, we needed to overcome the traditional positioning and relevance of industrial design within the company. We wanted the results of our project to be an aid to our global teams at all stages of innovation and project development. And, it wouldn't hurt if it could also help other divisions within our organization pursue their objectives.

Where We Started

Our Innovation and Design group consists of industrial design, advanced engineering, interaction design and design research. In 2007, our team of 5 design researchers visited 133 customers and partners in a continuing effort to understand their business operations. This research spanned a number of ongoing product development efforts. We conducted interviews, open brainstorming sessions, observational research, and validation reviews.

We gradually built up our understanding of our customers and their business practices. We built a rapport with our account teams and with each of their customers and partners. This allowed us to conduct detailed research and tell a more complete story of their respective businesses, replete with still and moving images.

Our Process

The research we conducted was structured into four areas: Baseline, Generative, Product Definition and Validation. Our Design Research team includes experts in Human Factors, Market Research, Industrial Design, Psychology and Design Research. Based on our efforts, we are better able to tell the story of a given company's needs. It is important to note that while learning as much as we could about their business, we looked for their "business" needs, not their "product" needs.

1. Baseline Research - What do we already know?

Baseline information includes the collective organizational knowledge built by the team over years of product development and marketing. Before customer or partner visits are scheduled, we first ensure we know the existing issues by interviewing industry and technology experts within our own organization. This includes account managers, field service engineers, customer service, and industry specialists who have a track record with the company and may be able to offer relevant information. We also review the successes and failures of our own products in this market, evaluating their ergonomics, features and functionality. We run or revisit human factors testing and design reviews of competitive products that are, or may be strong competition.

The visits are organized and conducted by the design researcher in coordination with the account manager. Individual members of the engineering or industrial design teams may attend the research visit to ensure greater impact on the development program. The customers or partners are selected after interviews with internal industry experts. A short list of 10-20 customers is chosen based on their interest in the area of study or the size of the business opportunity.

2. Generative Research - How can we drive innovation?

Through customer and partner interviews and observational research we seek to understand the "why" of a customer's business processes and how users work through the tasks. Once this information is captured, the research team can provide it to the design and engineer teams. Information gathering is enhanced when designers and engineers go together on research visits. Together, we look for the opportunities beyond the product design itself. How can we design a solution that will improve the customer's business process?

Interviews are conducted with customer's technology development teams and operations management teams. Here, the researcher is responsible for planning a discussion protocol that follows a consistent format for all visits. The protocol ensures effective comparisons between customers and the identification of feature and function requirements. It also allows us to capture a reliable story for future reference.

Time is scheduled with users and task managers to conduct direct observational research. This may include facility tours with time to observe operations, question users and managers, and occasionally ride-along with an employee on a workday. The observational research is critical to describing the customer's business operations in detail. Team members are responsible for capturing as much information as possible on the customer's business operations using video or still cameras, and a voice-recorder. We want to be able to tell the story of our customer's business accurately and as completely as possible.

Design researchers document descriptions of environments, users, task flow, responsibilities, timelines, and product issues. The customer's business operations could include receiving, delivery, sorting, inventory management, re-stocking, loading, task management, customer relationship management, point of sale, and other operations. "How many times do they need to refer to, lift or move a piece of merchandise?" "How are they able to link the purchaser with the item purchased?" "How large or small is their immediate workspace?" "Who needs access to particular documentation?" Many questions can be answered more accurately by observation of practice rather than relying on management statements of procedure. New client issues may emerge during this process.

Understanding the customer's business operations and their relationship and value to the bottom line, allow the engineering and design teams to envision new ways of solving the customer's business issues.

3. Product Definition - What is the right product fit?

Based on the first round of customer visits and generative research, the team will identify specific customers to revisit during the Product Definition phase. During this phase the researcher will bring sample models that demonstrate form, features and functionality. The Product Definition phase helps the team clearly define, and test the right product fit before there is a commitment to development.

We use model toolkits and storyboards to communicate potential design directions with our customers. By posing specific questions we can better see the complexity of the customer's needs, "What information do you need to display?", "How much information do you need to key-in?", "How well-lighted is your space - Is the product used in the storeroom and the storefront?", "How far do you need to carry or move the product...or the device to complete a transaction"? At this point, we work closely with marketing to nail down the right product fit. This is important for ensuring that the product need is reflected accurately in the marketing requirements document. This process also helps to continually focus the product development program and to plan for the interconnectivity with other engineering and manufacturing aspects involved in bringing the product to market.

4. Validation - How do we maintain the focus on a customer solution?

During the course of the development program, the Innovation and Design team needs 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 customer's needs. It also ensures key customers have ownership throughout the process.

The Results

An example of successful products that were pitched or re-directed through the efforts of the Innovation and Design group include a personal shopping terminal know as the "MC17." Symbol had created the category of personal shopping scanners in the late 1990's. They had gained success in Europe but the adoption was slow in North America. The company had not done anything in the intervening time to build the personal shopping business and was considering abandoning the category.

The Design and Research team initiated its own research to understand what opportunities might lead to growth in the personal shopping market. As part of our baseline research the team interviewed internal company stakeholders and developers of the first personal shopping

product. We ran human factors studies on the original product and studied shopping and technology trends.

For our generative research, team members visited customers (retailers), business partners, and observed end-users (shoppers) of the first generation system. Using the prototypes we also ran shopping simulations to test out concept assumptions.

Product Definition: We used working prototypes to evaluate design options and user interface concepts. The research derived from the prototypes led to specific features. For example, an expansion port, a customizable face-plate, and the user-interface were added to the final product design. By focusing on the customer needs, the design research team was also instrumental in aligning the company's marketing efforts with a successful business strategy. The final design has returned the company to a position of market dominance and the increased functionality of the product is opening up new market opportunities.

Validation: The Design and Research team built 100 functioning prototypes with tooled plastic housings. The prototypes demonstrated the potential of the personal shopping solution. The prototypes were used in field research with customers and generated interest and discussion that led to the development of a product.

Another fine example was a retail communications device with integrated bar code scanner known as the "CA50." This product was completely prototyped and successfully run through customer trials before the product development even began. Our team managed the entire process.

In 2005, Symbol (now Motorola) had no intention of producing a small, hand held, data capture and voice device for the retail vertical. But it was looking for ways to expand its product portfolio into new areas. Acting as a focal point for technology, user needs and market needs, Design Research was able to show the potential of a new device through a rigorous exploration and validation process. In 2008 the company released the CA50.

How We Used What We Learned

Generally, product development teams are formed and then disband as products reach the marketplace. The organizational learning that is gathered and analyzed during the course of that product development is often lost over time.

Our organization needed a process for capturing this learning and making it easily accessible to design, marketing and engineering teams. We set out to address the questions, "How can we better gather, catalogue, and summarize our understanding of our customer's needs?" And, "How can we facilitate the sharing and discussion of this information with all teams that play a key role in the development of any product for our customers?"

Documenting our research has always been an issue. In the past, individual researchers took responsibility for filing their own research findings and analyses. Retrieving the relevant research findings when you needed them was often difficult even if the researcher had a well-organized filing system. Others working with the same clients did not always have access to existing data.

A few years ago, to address the need to consolidate research data, the Innovation and Design group established an on-line database. In 2007, we saw an opportunity to use this database as a starting point for documenting and cataloguing observations of our customer's business operations. In addition, we looked for ways to use this database to facilitate the ongoing gathering and sharing of customer information among our global teams. Thus, we created our "Customer Intelligence Database (CID)."

After the first six months of use by the Innovation and Design team, 118 visit reports had been documented on CID. Five times the number in the original database. These visit reports contain 455 photos and video clips.

The re-design put a strong emphasis on easing the documentation process for our researchers. Design researchers can upload visit report documents while on the road, attach photos and edit video using Windows Movie Maker available on all PCs. Access to descriptions of our customer's business operations is much easier with word search capability that allows a researcher to list all visit reports related to a specific product or term. Alternatively, we can use a series of filters to define a specific area of study, industry vertical, product, region, application or visit date. By combining filters such as Retail (industry vertical) and Europe (region) the user can narrow her search to show only retail customers in Europe.

Unlike research consultants, who may work in a variety of areas, a corporate-based research team has the opportunity to build a valuable database of information on a company's customers over an extended period of time. Our team has used this database to create a good information "picture or story" of our customers. Internally, it is now the center of customer knowledge and is referenced by product developers looking for new opportunities.

Although the primary focus of CID is on the generative research and the understanding of the customer's business operations, it is also used for capturing baseline research, product definition research and validation research. This additional data is kept at a more secure level only accessible to our design research team. This consolidation allows for greater depth of client information and reduction of costs associated with data duplication.

Requests for access to the site have been growing among our organization's marketing and engineering development teams. The strategic marketing team has now asked to include some of their own customer feedback on CID with our team managing the content and access. The information is guarded carefully as it outlines in detail our customer's business operations.

Having this information at hand has been invaluable to the development teams. They 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 enables an ongoing capture of organizational knowledge.

CID is the key tool in documenting our understanding of our customer's business operations. In addition, it streamlines the sharing of information among our internal development teams and saves money by reducing redundancies in information gathering. Our customers are happy that we need less time to get up to speed with their situation and can spend more time, during meetings, on addressing particular issues.

What We Gained

As a result of our customer centered research process the Innovation and Design group is now uniquely positioned within the Enterprise Mobility Business to affect design development decisions within the division. One of the other major consequences of our research process is the strong focus it has put on innovation through customer knowledge.

With the support of the Chief Technology Officer (CTO), Innovation and Design has re-invigorated innovation within the company and now facilitates the division's 'Innovation Pipeline'. This is essentially a channel for ideas that allows any individual or team in the

company to pitch a concept based on a new technology or business opportunity. The ideas are structured and presented to management in a way that makes them easier to discuss and consider for funding and further exploration. Through this process employees or teams can be assured that their ideas will be considered for possible development.

Our extensive customer and user-focused research has led to the development of several innovative products. CID has become a great showcase for the Innovation and Design group. This in turn has strengthened our group's position as a center for customer research and innovation. The Innovation and Design group is now in a position to drive product development decisions and influence the direction of the company.