

Ethnographies in the Front End: Designing for Enhanced Customer Experiences*

Stephen R. Rosenthal and Mark Capper

Ethnographic research, carefully planned and implemented, is an effective method for providing user-centered perspectives early in the product innovation cycle. This article contributes operational perspectives on ethnographic inquiry in general and, in particular, on its effective integration in the front end of the product development process. It also explores issues of cost–benefit analysis in deciding when and how extensively to employ this mode of inquiry in the product innovation context. Based on a review of ethnographic approaches, in-depth case descriptions of two projects of this type and a review of twelve other projects, this article addresses three questions: (1) What key process steps and alternative approaches lead to insightful identification of relevant customer experiences? (2) What critical dimensions of customer experience offer hidden opportunities for innovative product design? (3) How are ethnographic studies planned, executed, and leveraged in the front end of the product development process when defining new product concepts? An analysis of these projects and related literature suggests particular kinds of product insights expected to be achieved from ethnographic inquiry, along with lessons for planning, conducting, and leveraging ethnographies. A successful ethnography may call attention to design opportunities not obvious at the outset but arising instead through appreciation of unconscious concerns or desires of the consumer. Accepting the notion of initial ambiguity helps ensure that such studies incorporate a broad coverage of potential kinds of issues and provide time and opportunities for serendipitous learning. Successful planning for ethnographies calls for an open mind coupled with explicit procedures for screening for diversity in respondents, gaining access to the desired range of respondents, and selecting a suitable ethnography team. Ethnographies use multiple observation and inquiry techniques in the field, often in combination with other techniques traditionally used in marketing research. They require teamwork, capturing relevant visual accounts, flexible probing for insights when surprises arise, and skill in modifying the ethnographic guide as needed during the study. The findings from ethnographies in the front end may be leveraged through traditional market research, innovation workshops, and formal product concept development.

Address correspondence to: Stephen R. Rosenthal, School of Management, Boston University, 595 Commonwealth Ave., Boston, MA 02215. Tel.: (617) 964-4514. E-mail: srrosent@bu.edu.

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Introduction

The collection and use of market insight, recognized as a core competency for innovation (APQC, 2001), calls for more than traditional market research. Consider the relatively user-friendly office copy machine in place today with large green

start buttons and icons to aid in fixing paper jams. This piece of office equipment has benefited from a long series of improvements, beginning with an insight developed in 1979. At that time Lucy Suchman, an anthropologist at the Xerox Palo Alto Research Center (PARC), employed field study methods and video technology to create a film of office workers struggling to operate their Xerox machine (Suchman, 1987). That film and subsequent related internal efforts sensitized design engineers at Xerox to the need for more user-friendly product design. More recently, Motorola staff, observing Chinese business executives at work in rural areas with no telephone service, became aware of an ad hoc system for using pagers to send coded messages. Motorola capitalized on this discovery by developing a two-way pager for the Chinese market. Sanders (2002) referenced these familiar examples. Von Hippel (1982, 1988) and von Hippel,

Thomke, and Sonnack (1999)'s work on lead users also illustrates ways through which product innovators have become aware of problems that could form the target of new product concepts or designs.

The rewards can be great when product innovation takes inspiration from deep insights on how consumers experience a product, improvise to create a new solution to an emerging need, or deal with environmental factors and other elements of the context of use. Because many product innovation opportunities like these are not obvious in advance, even to their intended customers, formal market research may fail to detect them. Instead, alternative approaches are needed to elicit subtle, often tacit needs of customers. The acquisition of such sound intelligence for effective product innovation requires product designers to go beyond the view of a product as a set of explicit performance features and functions and to consider the implications of the physical and emotional context of product use. The present article explores how and when this may be done during a critical early stage of the product innovation process.

Over the past two decades, the practice of product development management has evolved with the growing realization that observing what people might need is different from asking them what they want. This realization has led to the adaptation of a range of traditional social science techniques for use in product development. An early improvement of design practice, called design for usability (Adler and Winograd, 1992), emerged in response to the recognition that the design of manufacturing equipment exhibited significant failures in the absence of sufficient deep appreciation of intended users' skills. Although the technical specifications for equipment could be well established in advance based on intended customer applications, successful use also required special emphasis on other design requirements derived from the conditions of use.

Such notions of usability also were extended to all kinds of products, as design practice considered observed hands-on interactions of the user with the product. User feedback and observed difficulties yield insights on issues of product efficiency and effectiveness and directly related aspects of user satisfaction. Often, alternative prototype designs are developed and tested in the hands of intended customers to instill confidence that acceptable product usability has been achieved. Many companies run their own internal usability laboratories for this purpose. Others get potential customers to collaborate in external usability studies.

BIOGRAPHICAL SKETCHES

Dr. Stephen R. Rosenthal is professor of operations and technology management and director of the Center for Enterprise Leadership at Boston University. He received his Ph.D. from the University of California, Berkeley, M.S. from MIT, and B.S. from Brown University. His research and consulting concentrate on the management of product development, technology strategy, and enterprise leadership. Dr. Rosenthal's publications include the books *Effective Product Design and Development*, *Software by Design*, and *Reaching for the Knowledge Edge*, and his most recent articles have appeared in *Journal of Product Innovation Management*, *Sloan Management Review*, *Journal of Operations Management*, *IEEE Transactions on Engineering Management*, and *Journal of Management Studies*. His papers have won awards from the Academy of Management, Decision Sciences Institute, and Marketing Sciences Institute. At present he is working on issues of managing distributed product development, service innovation, and building organizational competencies.

Mr. Mark Capper is senior vice president of Added Value, a marketing insight and consulting agency. Mr. Capper oversees a practice that includes consulting to industry for innovation, marketing research, marketing strategy, and product and design planning. Mark has nearly 15 years domestic and international experience in conducting research in the planning and development of products, including the applications of ethnography in the product development process. Prior to joining Added Value, Mark was general manager of strategy and research for Herbst LaZar Bell, senior development manager of advance marketing for Herman Miller Inc., director of product planning and research for Hauser, Inc., and senior R&D project manager for Baxter Healthcare Corporation's pharmaceutical division. Mr. Capper received an M.B.A. from the University of Southern California, an M.S. in engineering from the University of Michigan, and a B.S. in natural science from Michigan State University. He has lectured on design and marketing research at the Art Center College of Design in Pasadena, California, on marketing research in product development at Northwestern University in Evanston, Illinois, and on product and business strategy in the Marshall Business School at the University of Southern California at Los Angeles.

The common quest in all such usability studies is to ensure that product design choices at the human interface adequately reflect the hands-on needs and skills of its intended users. Originally, this approach dealt with operator–machine interfaces with an emphasis on ergonomic factors. Later, it also embraced cognitive dimensions of the interfaces. Usability assessments generally assume that the intended context of use and relevant characteristics of the users, as well as the product's objectives, can be easily specified in advance. Lessons learned from such studies inform the subsequent round of product designs.

Whereas the pioneering work at Xerox, which led to a stream of ideas for built-in user aids, may be complemented by such subsequent usability studies, the introductory example from Motorola illustrates more than the need for usability studies during the product innovation process. The Motorola example calls attention to the fact that innovation often starts with an insight about an overlooked need or environmental factors and other dimensions of the context of use—in sum, considerations less obvious than a physical user interface. Such insights often come from observing customers using existing products or services and may yield what Leonard and Rayport (1997) called empathic design.

Here the sense of a new product opportunity or constraint is surfaced well before the testing of prototypes by focusing on the full user experience. Transcending concerns of human factors, this approach includes the full social context within which product use is embedded. The search for such insights happens in the field through the collection of qualitative data to be analyzed and then applied to the design of an initial product concept. The potential contributions of various qualitative techniques (e.g., interviews, observation, exercises) in obtaining customer needs for product development are presented in Griffin (1996). The *PDMA Toolbook* defines such ethnographic inquiry as “a descriptive, qualitative market research methodology for studying the customer in relation to his or her environment. Researchers spend time in the field observing customers and their environment to acquire a deep understanding of customers' lifestyles or cultures as a basis for better understanding their needs and problems” (Belliveau, Griffin, and Sommerer, 2002, p. 442). Though ethnographic inquiry is performed using special field-based observational methods and is usually conducted by specialists in these methods, it is not uncommon to combine the methods with traditional marketing research tech-

niques. Ethnographic inquiry may be conducted at various points in the product development cycle and may deal with issues regarding developing a new product concept, extending the life cycle of a product, helping define marketing campaign themes, testing a prototype, or understanding consumers' out-of-the-box experiences at home as they unpack, set up, or install and attempt to initiate use of a product. This use of ethnography attempts to achieve enhancements in package design or product-related information included in the package.

The present article focuses on the use of ethnographic activity prior to the design stage of the product development process. Then ethnography is part of the more loosely structured front end, where product concepts are formulated and considered, often through the development of early prototypes (see Khurana and Rosenthal, 1998 and Reinertsen and Smith, 1991). Such ethnographic approaches in the front end need to be better understood. What key process steps, modes of observation, and other considerations lead to insightful identification of relevant customer experiences? What critical dimensions of customer experience offer hidden opportunities for innovative product design? How are ethnographic research findings leveraged in the front end of the product development process when defining new product concepts?

These questions are addressed at first by identifying the underlying theory for ethnographic inquiry and the range of approaches and techniques that may be employed in ethnographic work. Two recent projects where ethnography was used to pursue different objectives illustrate the application of these approaches. Though employing somewhat different approaches, each ethnographic inquiry generated insights that affected subsequent product innovation. Findings from these and 12 other cases provide a basis for reflecting on the cost effectiveness of ethnographies in general, successful practices in particular, and potential impacts on new product concepts and strategies.

Ethnographic Approaches to Identifying Customer Requirements

Ethnographic inquiry has been used in the social sciences long before its application in business. Its roots can be found in several traditions of research. In the field of anthropology, the notion of thick description, popularized by Geertz (1973), emphasizes the kind of

insightful accounts of behaviors and rituals an outsider can develop when acculturized and accepted as an observer. A branch of sociology called symbolic interactionism, popularized by Goffman (1974), uses the technique of frame analysis to study specialized group activities with special attention to the meaning of social interactions. Garfinkel (1967) pioneered the development of the ethnomethodological perspective to study everyday practices, including conversations, by ordinary people in their day-to-day lives. And other sociologists, following the perspective of Berger and Luckmann (1967), socially reconstruct reality as a basis for developing insights into behaviors. Lofland and Lofland (1995) provided a classic guide to gathering and focusing data to analyze social settings using traditional qualitative sociological methods. And LeCompte and Schensul (1999) extensively described the ethnographic inquiry—including philosophical roots, guidelines on design, data collection and analysis, and ethical issues.

Business ethnography draws on these qualitative research traditions to create research skills and methods that can be applied to create deep understanding of activities and populations of interest for commercial purposes, one of which is product innovation. The term *contextual inquiry* is used somewhat as a simile for ethnographic inquiry in the field of product innovation management because they both aim at uncovering customer-perceived value through systematic observations of respondents in ordinary settings (Miller and Swaddling, 2002). Contextual inquiry is basically a structured field interviewing method that focuses on discovery rather than evaluation, more like learning than testing. The term *ethnographic inquiry* is employed here due to its long-standing usage in social science, more all-encompassing set of techniques that may be employed, and familiar professional and educational recognition.

This kind of ethnographic inquiry must be designed to fit specific product development objectives. Ethnographies can be conducted in any customer setting: home, office, hospital, bank, factory, or other activity center. The use of in-home visits is well accepted for consumer market analysis and segmentation (Davis, 1996). The goal is always to make implicit needs explicit by describing how customers and users experience products in practice rather than how they report these experiences in a traditional marketing research setting. In addition, the organization may benefit through a contextual understanding of customer attitudes and beliefs, based on both observation and

reporting rather than consumer responses gathered outside the relevant context. The range of insights may lead to new applications of existing products, to design improvements to existing products, to identification of new product opportunities, or to appreciation for the emotional, social, psychological, or cultural dimensions of a product's value to the user. Ethnography differs from traditional marketing research techniques in that the research focus is on elements of culture and context and the research objectives usually transcend collecting data from fully specified interview protocols or survey instruments. Since ethnography may borrow techniques such as projective interviews and questionnaires from traditional marketing research, these techniques are, therefore, administered and interpreted within a broader cultural context.

The Theory of Ethnography for Product Innovation

Firms choose to incur the cost and effort of ethnographies in the context of product design to identify articulated and unarticulated needs that are otherwise difficult to elicit. For example, when consumers are studied in the context of product use, they receive memory cues from the environment of use. In addition, when they perform tasks or reenact rituals with products in the context of use, it further prompts their memory of salient aspects of the product. Through observation and careful listening, ethnographers and other members of a research team can gather further information such as the difficulties in using products that consumers have learned to accept and have long buried in their subconscious minds. Ethnographers also can learn about attitudes and values of respondents by observing the products they own, the decor of their home or other activity location, and other factors. These settings allow researchers to observe behavior and other evidence the respondent may not have otherwise believed to be relevant. In addition, such home and workplace environments contain information that leads to a more in-depth understanding of the attitudes and values of the customer and provide clues that can assist the product designer in creating a product that resonates with the customer's personality, taste, and lifestyle. The learning possibilities in these relatively unstructured settings often transcend more traditional marketing research contexts. When respondents are brought in for focus groups or one-on-one interviews, the facility is void

of the rich context of the respondent's environment; laboratory settings for observing behavior are more constrained than the subjects' normal context of action.

The ethnographic approach deals with small, carefully screened samples of the potential or target customer domain. Whereas the selected sample of customers might be based on socioeconomic, geographical, or ethnic categories, the results of the inquiry are more likely presented in a cross-cutting fashion to reflect similarities among customers based on product-related attitudes, values, and needs rather than on their initial demographic categories. Compelling findings are usually not proven by statistical inference because the samples are often too small and the data-gathering approach is more open ended than that of formal, questionnaire-based market surveys. Instead, these findings are based on the intuition of participants in the ethnographies. These intuitions and supporting evidence then need to be communicated to new product designers and other decision makers who did not participate in the field investigations.

Ethnographic Techniques

There is no single best practice for conducting such product-related ethnographies but rather a set of techniques from which to select that are based on the focus and objectives of the inquiry. The results depend on the skill of the ethnographic observer and the chosen analytic technique. A brief discussion of a range of ethnographic techniques is summarized in Table 1, and some market research techniques frequently applied in ethnographic settings is presented following. For more extensive discussion of design research methods and perspectives see Laurel (2003).

Passive field observation by the research team may be explicit when the subject is aware of the observation or disguised when the subject is not. Explicit field observation may yield a variety of types of data ranging from written field notes to recorded media such as video. Such field observation is guided by preestablished schedules and plans. Video recordings provide a combination of visual and audio data. Digital webcam technology has the added attraction of being able to provide real-time observations from any place in the world. Hardware costs need to be factored into the decision to use these approaches. A variant on video tracking is the time-lapsed or motion-triggered approach that captures behavior patterns, movement,

and actions in a punctuated manner over an extended period of time. The added potential for insights from this method needs to be viewed in light of its additional logistical complexity. A lower-cost tracking option is photo tracking using traditional cameras. All such indirect field observation studies tend to be exploratory in nature and to require skilled researchers to form conclusions from reviewing the recorded behavior. Thus, although these methods are relatively inexpensive for data collection, the analysis stage can be very labor intensive and expensive. There is potential bias from explicit field observations in that subjects' behaviors may be affected by awareness that observation is taking place. Furthermore, indirect technology-based observation is inherently limited to some extent by its range of sensory input or perspective (e.g., video has a restricted field of vision). The latter two limitations sometimes may be overcome through the use of disguised field observation, where the ethnographer plays the role of a participant in the event or ritual under study. This undercover passive observation approach does not distort the subjects' behavior and yields more complete empathic understanding, but it is not always an option. Field observation by a trained researcher may employ all six senses where appropriate.

The inclusion of active ethnographic interviews in a field observation setting may provide a wide range of additional inputs to the design of innovative products. Traditional interviews of this sort are based on a prepared guide, preselected subjects, and direct observation. They call for a skilled ethnographer because the interview approach tends to be flexible and holistic—and, as discussed in the following section, additional cost and implementation issues are associated with selecting and acquiring the right range of respondents. Another kind of ethnographic interview, called an intercept interview, occurs when a trained person approaches a subject at the site of action and may yield fresh, unanticipated perspectives. For example, an ethnographer working for an automobile manufacturer might observe customers interacting with vehicles at hotels or grocery stores to seek ways to improve access to storage space and then may follow up the observation by interviewing the participant. The logistics of combining observation with intercept interviews are relatively complex and time consuming, and the stream of extemporaneous input needs to be carefully sifted for insights.

Participant observation is an intensive ethnographic approach where trained ethnographers acquire

Table 1. Summary of Ethnographic Approaches and Techniques^a

Approach/Technique	Strength	Limitation	Examples and General References
Field Observation (Passive)			See Emerson, Fretz, and Shaw (1995); Goode and Hatt (1952)
Written Field Notes	Record meaning of events as they occur Relatively unobtrusive Minimum advance planning	Limited record of events Cannot probe for insights without creating a break in subject's action	Prescheduled observation of surgical procedure Consumer-use observation for a computer product design
Full Video Recording	Comprehensive visual and sound data	Limited angle of view High evaluation cost (\$100–\$300 per video per hour) Respondents may be apprehensive Laws or ethics may prohibit use	Video of fishing activity for later analysis and sharing with team
Disguised Field Observation	Less obtrusive View true behavior	Possible ethical concerns No opportunity to probe or confirm interpretation with subject	Observing shoppers load groceries into their automobiles without their knowledge
Ethnographic Interview (Active) Observation and Interview of Individuals	Preselected subjects and script Thorough inquiry	Screening costs (\$100–300 per respondent depending on difficulty to recruit) Possible Hawthorne effect	See Spradley (1979) Study of users of lady shavers within their homes Study of floor mopping by housekeepers
Spontaneous Intercept Interviews	Action triggered with natural transition to interview No recruitment cost	Complex logistics result in increased on-site labor hours Lack of prescreening can yield gaps in sample of subjects	Interview of a shopper in a supermarket parking lot after observing shopper loading groceries into the back seat
On-Site Observation and Interviews of Affinity Groups	Observe joint action and peer relationships	Complex coordination effort is common Effort required to gain acceptance Possible bias due to dominant group member	Surgical operating room team of doctors and scrub nurses Mix with a group of local college students at a selected coffee shop to better understand their unique attitudes and values
Participant Observation Direct Involvement in Events	Potential for surprise findings is high Stresses empathic understanding	Need skilled observers, access to right events Limited exploration of researcher observations	See Spradley (1980) Participate in a Harley Davidson event to understand the culture associated with the product and brand

^a Broad coverage of these and related techniques can be found in Schensul, Schensul, and LeCompte (1999).

first-hand experience of a target culture by joining with respondents in relevant activity. Such direct interaction provides vivid seeing-is-believing kinds of experiences that uncover product innovation insights. The approach is limited to respondents who are open-minded enough not to be disturbed by such close-in participation and intensive observation by an outsider.

In general, then, the product-related ethnographic approach allows a research team to learn more about the attitudes and values of the consumer by witnessing other products and artifacts important to the respondent. In an in-depth, one-on-one ethnography respondents report behaviors as their memory is prompted either by artifacts in their natural environment or while they are discussing related issues or enacting related behaviors in the open-ended ethnographic format. Consumers also may be observed as they work around poorly performing products by modifying their pattern of use. For further description of this phenomenon—including discussions of the driving forces of discontinuities, disequilibrium, disintermediation, and compensatory behavior—see Miller (2002).

The first few times they perform such work-around behavior, consumers may consciously be able to reflect on these actions, but eventually these actions become routines not easily accessible to the conscious mind through traditional interviewing techniques. Skilled observers such as ethnographers, designers, and engineers are more effective in uncovering such work-around behaviors through direct observation in the normal context of use. These observations easily trigger follow-on discussions with the consumer that may lead to further insights for product innovation.

Use of Interviews and Other Market Research Techniques

Ethnographic inquiry using methods just described is frequently enhanced by including selected marketing research techniques as part of the study. Questioning respondents using techniques commonly used in marketing research may yield a highly empathetic understanding in cases where they may not be willing or able to directly address an issue or to consciously explain motivations for their past consumer behavior or product preferences. Projective techniques attempt to stimulate such understanding indirectly by having subjects project their own feelings onto an unstructured situation. Versatile methods can be employed

for this device—including metaphors, stories, word associations, or drawings—to yield core meaning. The data for field-based self-reported behavior trace study can be collected by written logs or diaries or by technology-assisted tracking mechanisms in support of an ethnographic study. Following the log approach, subjects write down their actions and thoughts in written or electronic form, in free form, or in response to specific questions or prompts, either daily or during specific activities. A variant of this approach, the action log, provides a visual sketch or map of a person's daily routine and movements. Such descriptive logs are valuable supplements to observation by an ethnographer, and the analysis of such data often raises new, perhaps subconscious, elements for consideration by product designers. Limitations of the value of written logs—the writing skill of the respondent or the commitment of the respondent to comply—may be overcome by using more direct technology-based descriptive records such as audio or video recording of selected activities conducted in field sites of interest. Ethnographic inquiry using such logs can involve a large number of respondents because the researcher does not have to interview each and every respondent. Studies of this sort with large samples (i.e., over 100 respondents) accommodate robust statistical analysis. Other techniques common to marketing research such as surveys, laddering, style questioning, affinity group interviews, and free lists also may be administered in the field during ethnographic studies.

Each of the ethnographic and traditional interviewing techniques summarized here may be applied independently or in concert with others, with the choice depending on the situation being explored, project objectives, and the resources available. To yield desired insights ethnographic studies need to be intentionally designed and carefully executed to achieve a reasonable balance between their potential value and the associated cost and time. A later section identifies other related trade-offs to be considered at the research planning stage.

It is also usually necessary to combine ethnography with more traditional marketing research methods. Though ethnography can be used to gather insights by taking a deep dive into consumer behavior and environment, standard group interview techniques can be used to gather insights into consumer perceptions of competitive products, brands, design concepts, or product prototypes. Quantitative research, conducted once the interviews have been completed, can be especially effective when market research surveys, with

much larger sample sizes, are designed to test the validity and potential commercial impact of these initial qualitative insights.

Research Approach

Fourteen recent projects employing ethnographic approaches were reviewed as a basis for illustrating and further understanding these techniques, their costs, and potential benefits (see the summary of methodology in the Appendix). Reflecting the focal interest in this article, all these cases involved tangible products, as distinguished from services, and all but one were intended to support the front end of the product development process when product concepts are defined. Table 2 compares these cases across several dimensions to indicate the range of their objectives, scope, techniques, and costs.

As suggested in Table 2, the costs of ethnographic inquiry vary in relationship to the overall sample size, nature of the sample, and research methods em-

ployed. The number of respondents increases as more diversity or increased level of rigor is sought. An increased sample size, in turn, brings additional respondent recruitment costs and incentive fees. Low incidence of desired respondents tends to further increase recruitment costs and compensation for respondents' time. An increase in the duration of research fieldwork increases not only the fieldwork costs but also the duration and cost of subsequent analysis. Finally, research methods that require a high level of technology or that increase the duration of the fieldwork thus add to the full costs of ethnographic inquiry.

The present article presents descriptions of two of these cases. In the first case, Panasonic wanted to gain market share in the women's electric shaver market and in 1995 hired an industrial design and product development company to develop a new lady shaver. Panasonic desired more than styling and detailed engineering part-design assistance for this new product. Seeking more fundamental assistance in developing a new perspective on the shaver market in the United

Table 2. Summary of Reviewed Projects^a

Product Category	Special Project Objective ^b	Ethnographic Methods Used ^c	Sample Size	Duration (weeks) ^d	Cost (U.S. dollars)	Additional Research Methods ^e
Electronic Lady Shaver	Increase market share	I, P, O, V	12 consumers	6	20	FG, SS, CT, US
Fishing Motor	New strategy	I, P, O, V, M	12 consumers	8	50	FG, IG
Bathroom Scales	US market only	I, P, V	4 consumers	4	16	FG
Kitchen Scales	European market	I, P, V	8 consumers (4US + 4UK)	5	40	FG
Medical/Health care	New B2B category	I, E, V	8 healthcare professionals	6	45	FG, MS, IW
Blood Glucose Meters	US B2B professional market	E, P	4 consumers	4	20	FG
Surgical Device	International market	E, P, A	8 triads of professionals	6	50	None
Air Purifiers	US market	I, O, P, V	10 consumers + 4 O/Ps	6	50	FG, IW
Package for Pharmaceutical Product	US market	I, P, V	6 consumers	4	24	FG
Mosquito Control	Evaluate production prototypes	I, O, V	8 consumers	8	35	FG
Engineering Test and Measurement	International B2B market	I	2/3 engineers, technicians at 8 facilities	6	40	MS, IW
Drain Care in Home	Ideation for new product	I, P, V	8 consumers	6	30	IW
Food Storage Consumable	Product enhancement	I, P, V	8 consumers	6	30	None
Toilet Bowl Cleaner	Ideation within category	P, O, V, I	6 consumers	5	24	IW

^a Source: Project case files from two consultant design firms.

^b All projects sought customer needs, attitudes, and contextual understanding to support the design of a new product; other objectives are as noted.

^c I = on-site interviews; P = projective techniques; O = observation; V = videotape; M = immersion; E = expert interviews; A = affinity group interviews.

^d Includes planning, fieldwork, and ethnographic analysis.

^e FG = focus groups; SS = segmentation study; IW = innovation workshop; MS = market survey; CT = concept test; US = user study. These are not included in cost or duration of the ethnography.

States, they decided to contract with an organization indigenous to the U.S. market with the capability of translating the new perspective into a strategy for the new product and then into an innovative new design. In the second case, in 2003 a manufacturer of equipment for sport fishermen hired a product design and development company to assist in the development of a next-generation fishing motor. This product, used by both professional and amateur sport fishermen, played an important role in the maneuvering and positioning of the boat while fishing. The client wanted a design company to look closely at the needs associated with two specific types of fishermen: anglers who fish for species predominantly found in shallow waters and those who fish for species found in deep, open waters.

The purpose of presenting these two cases is partially descriptive—to illustrate the scope and contents of actual projects—and partially analytic. These case descriptions include objectives of the project, key players and steps in initiating the project; key process steps and alternative approaches that led to important realizations about relevant customer experiences; critical dimensions of customer experience that offered hidden opportunities for innovative product design; and highlights of how insights from the ethnographic research findings were leveraged in subsequent product innovation. Aspects of the case that deal with planning an ethnographic inquiry are presented in the following section, followed by implementation and impacts.

Planning an Ethnographic Inquiry

The first and most critical element of planning for ethnographic inquiry within the context of product development is to identify the objectives to be considered during the fieldwork and subsequent analysis and reporting. In formulating the objectives, it is important to determine whether the underlying motivation of the process is to seek new opportunities and markets or to focus inquiry within a defined target market. When seeking to identify new opportunities and markets, researchers should plan to involve respondents who own competitive products or who may be potential customers but have not committed to its purchase. A program focused on enhancing an existing product for enhanced appeal to an existing market segment might only focus on members of the target market segment who are current users of the product. It is also necessary to define the boundary of the

inquiry—for example, investigating a specific issue (e.g., interaction with a software user interface) or understanding the motivations and behavior of a specific segment of consumers (e.g., shopping for luxury products).

Once the research objectives are defined, the most appropriate set of methodologies can be specified. Indirect observation techniques might be chosen if the researcher is concerned that interaction with the participant might influence behavior. Behavior trace with technology tracking might be used when it is difficult to predict when an event of interest might occur, such as the use of a conference room while studying a work environment. Direct observation techniques are commonly used because they provide both an opportunity to supplement observation with in-depth understanding via questioning. In addition to considering the project budget, timeline, and resources, in making the choice among alternative research methods, the context of the research must be considered. Though a research team may be interested in observing consumers shopping in a retail setting, the retail facility will usually not allow an in-depth interview or the use of photographic or video equipment.

Panasonic case. The lady shaver research team determined that it was important to observe shaving behavior by women within their home environment and also to discuss shaving habits and practices. They wanted to see where shavers were stored—to discuss how the participants choose the shavers they purchase and how they perceive competitive products. Accordingly, their research approach combined direct observation and interviews with video and still photography. An all-female team was selected to allow the participants to feel comfortable with the research process.

Fishing motor case. To fully understand how fishermen interact with products while fishing, the team knew they would have to observe and interview fishermen while fishing in a variety of conditions. Because the actual handling characteristics of the boat and motor were important, the team realized the need for some hands-on participation in the fishing process. Thus, the team decided to combine direct observation and immersion methodologies. Acknowledgement of the complex techniques, unique culture, and specialized language of the target population, the project leader specified that the research team should be composed of at least one member who had considerable fishing knowledge and experience.

Defining the Sample of Respondents

Once the research objectives are fully delineated, the planner needs to define the parameters of the desired sample of respondents in terms of specific qualifiers that define inclusion and assure diversity. For example, although the set may be limited to males considering the purchase of a sports car, there may be a desire to understand how climate, level of education, and urbanization affects attitudes and behaviors within the sample. Thus, the sample plan might include respondents from a variety of climates, as well as rural, suburban, and urban dwellers. If the goal is to expand the market for an existing product category into new dimensions, it is important that the sample universe be structured broadly enough to systematically cover the relevant ground.

It is questionable whether friends and family should be used as all or as part of the ethnographic sample population. Advantages for using friends and family include the potential of a more natural response of the participant to a known researcher and the ability to increase sample size while reducing costs associated with recruiting incentives. Disadvantages of using friends and family include the potential for inadequate diversity in the sample or bias or constraints in response or activity due to the relationship between the participant and researcher—which may be eliminated if the participant is not familiar with any member of the field research team—or a respondent's prior knowledge about the research topic, objectives, or the client organization. Generally, the use of more arms' length respondents is preferred whenever the research requires access to a specialized population group not easily represented by family or friends or respondents who lack specific information family and friends would likely possess.

Prior to defining a specific recruitment specification, it is important to consider sample size and the location of all interviews. In some instances, interviews may occur in more than a single location. For example, if there is interest in understanding how experiences and attitudes in the workplace influence behavior and purchases at home, the ethnographic inquiry is likely to extend across two or more locations. The amount of time spent in the field on one site visit, techniques chosen, topic, and number of target markets also will influence the number of sites visited. In general, as the diversity of the sample increases, so should the sample size. In determining the appropriate sample size, as Griffin and Hauser (1993) demon-

strated researchers should consider that there are diminishing returns to adding more interviews when seeking insight on customer requirements. Most ethnographic methods are implemented with 25 or fewer informants.

Panasonic case. The recruitment and selection of respondents for the ethnographic research on the lady shaver product was based on a prespecified sample universe, defined by the project manager and ethnographer to contain relevant differentiation with respect to age, race, geographic region, and present shaver use. The project team did not know in advance whether geography or ethnicity would play a role in shaving habits and practices, although they believed that climate and regional attitudes, values, and practices might be relevant. Accordingly, the sample was taken across three different cities—Los Angeles, Chicago, and the New York City area—and included respondents living in a range from urban to rural environments. Because Panasonic's dual strategy was to gain market share from competitors in the electric shaver market and also to recruit new customers to the category by converting blade shavers to electric shavers, the sample was split equally between blade shavers who experienced dissatisfaction with their current regimen and women who had purchased an electric shaver from a predefined list of competitive products within the previous year. Based on these factors and budgetary considerations, a total of 12 female respondents were recruited for this study.

Fishing motor case. The selection of a sample of respondents for the fishing motor research reflected the unique nature of the product, context of use, and culture. Two types of fishermen were included in the study: (1) anglers, more commonly found in northern states, who fished in large, open bodies of water; and (2) anglers, common in both northern and southern states, who fished in both open water and shallow water with obstructions such as logs, stumps, weeds, rocks, and sand. Two particular geographic regions were then chosen where the client knew that fishermen would have diverse product preferences and unique local cultures. For each region two specific bodies of water were chosen that presented a variety of relevant challenges to anglers. These considerations led the design team to seek a total of 18 respondents, varying in age, range of product ownership, type of fishing contexts, and levels of experience from novice to professional.

Recruitment of Respondents

Once the sample is defined and the parameters of the ethnographic inquiry are determined, the recruitment of respondents can begin. Successful recruitment starts with formulating a list of screening criteria, or even a screening questionnaire, to assure that all respondents lie within the sample specification and that the desired diversity within the sample is achieved. During the recruitment and screening process, respondents are told where to meet and what to expect during the interview event and are usually offered an incentive—typically in the form of cash—in return for their participation. Although the provision of information such as the specific product or brand that is the focus of the inquiry is optional, the information provided prior to the event should be adequate to promote the sense that participation will be safe and comfortable.

Panasonic case. To assure the proper group of participants was recruited, the research team created a questionnaire designed to screen respondents based on the specified criteria. The screener included a general description of events, cautioned the participant not to modify their home environment or behavior in any way—other than donning a bathing suit while shaving—and specified the amount of the cash incentive and that the session would be videotaped. Specific details such as the client and brand name were left out of the guide to assure the participants would be blind to such elements. The screener questionnaire was distributed to a marketing research recruitment firm in each region who recruited the participants and scheduled the appointments.

Fishing motor case. Based on the attributes of desired respondents, the research team created a screener questionnaire for use by marketing research recruitment firms in each region. Initially, recruitment of a suitable set of professional and amateur anglers was challenging; anglers declined to participate based on the information provided. The consulting firm then modified the recruitment approach to begin in each region by identifying a local fishing guide, professional angler, or a fisherman who had influence over other anglers in the area. Once these thought leaders, who were identified by a marketing expert in the client organization, were recruited, other local anglers signed on to participate in the study. Once recruited, respondents were given specific instructions not to

prepare their auto, boat, or fishing equipment prior to the prescheduled interview. They were told in advance to expect a research team of three to accompany them on their boat while fishing for up to two hours and that the field study would consist of an interview plus recordings using a combination of video, audio, and still photos.

Preparation of the Guide

Prior to conducting fieldwork, the ethnographer must prepare a guide targeted to the project's objectives. The guide is usually more of an outline of topics to be covered, which is distinguished from the more formal set of prespecified questions that typifies a marketing research interview guide or survey. When the ethnographer intends for the respondent to interact with a product or to demonstrate a common behavior associated with a task or operation of equipment, the guide may specify the nature of those behaviors or responses. Once in the field, the ethnographer usually conducts a loose interview, allowing the respondent to feel comfortable and to share control of the interview process. Though the ethnographer may desire to cover a list of topics in the interview guide, it is usually beneficial to allow the informant to discuss what is important and relevant to the topic at hand. Thus, the resulting information is much more oriented to discovery and complete understanding rather than to fully and quantitatively resolving specific issues. The particular observation methods and questions are designed to effectively uncover the desired information. For example, when the inquiry is focused on a product the user currently owns, the guide may require the respondent to take the product out of storage and to use it. Projective questions may be incorporated to probe the respondent's experience—including problems and frustrations—when purchasing the product, when using it for the first time, and when using it in different situations or occasions. The guide may shape inquiry into a respondent's attitudes and purchasing behavior for other products or artifacts in their environment and connections with the product in question. Depending on the objective of the ethnography, the guide may include rigid protocols for using a product or product prototypes, for observing the purchase decision process, or for exploring relationships of peers, family members, and others relevant to the inquiry.

Panasonic case. The guide, developed by the team and then approved by the client, began with a review

of the expectations for the session, including the general topics to be discussed, the use of a video camera, and the overall length of the session. It outlined an initial discussion regarding shaving habits and practices, which was intended to put the respondent at ease prior to commencing the shaving activity. It then provided observation guidance starting with respondents removing their shaver from storage, following their entire shaving process, and ending with their replacing the shaver in storage. Finally, the guide prescribed an interview with respondents regarding their motivation for shaving, their attitudes and values regarding shaving and shaving products, and how they came to own their shaver. The guide explained how to complete the interview by showing each participant a variety of contemporary shaving products and then gathering their responses to these products.

Fishing motor case. The consultant team created an extensive guide designed to understand the respondents' selection, storage, and transport of the motor and to achieve an in-depth understanding of their use of the motor in a variety of situations. More specifically, the guide supported the initial communication with the participant with overview information about the session and related expectations. It covered the variety of observation opportunities inherent in the field research: participants' home and garage environment (in cases where they were met there); participants, their boat, vehicle, and trailer at the boat launching; the launch followed by participants' motoring to the fishing location, deploying the fishing motor, and demonstrating at least three fishing methods they might commonly practice on familiar areas of the lake where they had used those techniques in the past; stowing the fishing motor and motoring back to the dock or launch site; and stowing the boat. The guide explained that the team should ask the participant to describe every activity and event at will, with the ethnographer leading the questioning and other project team members probing when signaled by the ethnographer. The guide covered the conclusion of the research session with final probes by the research team and provision of the specified compensation to the participant.

Planning for Information Collection and Presentation

The ethnographer also must consider how the information from the inquiry will be recorded, analyzed,

and presented. The ethnographer must prepare technology such as audio tape recorders, video cameras, or other necessary equipment prior to going into the field. Advance planning for the postfieldwork portion of ethnographic inquiry includes the ethnographer's time and effort required to review all notes, audiotapes, and videotapes to fully and completely understand the issues indicated in the objectives. Frequently the review and analysis process may take two to four times the duration of the actual field inquiry. Advance provision also may be required for additional personnel such as psychologists, usability specialists, or ergonomics experts to analyze recorded data. Finally, plans must be made for reporting results of the ethnographic inquiry. Reports rich with photos, videos, or computer multimedia presentations—where key findings are supported with both audio and video evidence from the inquiry—are not uncommon.

Case Descriptions

Case 1: Panasonic Lady Shaver

Project scope, timeline, and objectives. Panasonic's original brief for the program was open ended with specified sales goals for the new product and timeline constraints for the ensuing development program. The project was to start with new concept identification and evaluation and to proceed through product design and development. Panasonic wanted something new: a dramatic product departure that would increase their share of the U.S. ladies shaver market, which was below 5 percent at the time, by leveraging their key brand attribute—shavers that can be used in both wet and dry environments. As is typical, Panasonic also wanted the new product to employ many existing internal components and to rely on proven component layouts. The initial inquiry from Panasonic, sent to several design consulting firms, originated from the research and development (R&D) manager representing the shaver category in the United States. On qualification of the final three firms for consideration, a team from Panasonic—including the U.S. category marketing manager, the U.S. vice president of marketing, a general manager for the category from Japan, and several engineering representatives from Japan—visited these firms to further qualify them. Participation at this meeting by the team subsequently selected was the principal executive of the design firm, the director of research, the design studio

manager, a design project manager, and an engineering manager. The initial meeting was structured to provide both an overview of the consultant firm as well as a review of the proposal and timeline for the program. The consultant firm presented case studies from previous work to demonstrate their capabilities and what could be expected as deliverables from each phase of work.

Panasonic's choice of consultant firm was based on the comprehensiveness of the candidate firm's approach to research, which included ethnography plus qualitative and quantitative traditional marketing research methodologies. Panasonic also placed value on the fact that, prior to awarding the contract, the consulting firm committed an all-female team for both the ethnographic research and key roles in the industrial design process. Panasonic's decision was led by their R&D category manager, a Japanese expatriate on a management track in the Matsushita organization.

This entire project, as shown in Table 3, had a total duration of 46 weeks, of which ethnographic inquiry took place within a two-week period. The project manager and the ethnographer on the selected research team worked jointly with the client to create a list of objectives for ethnographic inquiry that included the following:

- Identify the underlying attitudes, lifestyle factors, or needs associated with the choice of an electric

shaver over a blade razor and with the purchase or preference of one electric shaver over another.

- Identify unmet needs relating to the shaving experience; the location of shaving; and acts of storing, deploying, charging, and caring for an electric shaver.
- Understand underlying motivations for shaving and all aspects of the shaving experience, including likes, dislikes, time of day, location, and other behaviors and attitudes.
- Understand any ergonomic and performance-associated needs.
- Seek opportunities to deliver relevant benefits through Panasonic's wet-dry shaving technology.

Ethnographic approach. The selected product design and development consultant firm had skilled ethnographic researchers on staff. This firm, in turn, selected a quantitative research firm to conduct survey research and segmentation studies and brought them in early in the process to assure coordination of all research methods and effective collaboration between the two firms. It was most important that the findings from the initial ethnographic research would be integrated into the subsequent focus groups and survey research. Achieving this integration required proper time sequencing of the various research processes and collaboration among the managers and researchers responsible for each methodology. Ethnographers set out to learn about attitudes and values of respondents by observing such things as respondents' owned products and the decor of their home. The refined understanding gained from such in-home ethnography was later shared among the focus group researchers, who conducted small-group discussions with a panel of consumers, and the survey researchers. These more traditional market research methodologies were used to confirm and further clarify the ethnographic findings.

Two female members of the project team, a skilled ethnographer and an industrial designer, were assigned to jointly conduct each ethnographic interview so that both disciplines would simultaneously be exposed to real consumer behavior and the context of product use. After a brief session devoted to putting the subject at ease, they observed respondents' shaving process—remember that respondents wore bathing suits—in the environment where the respondent would typically shave. The observers asked probing questions and took notice of the room in which the respondent shaved, the storage location for the

Table 3. Timeline for Panasonic Shaver Project

Week	Activity
1	Program initiation meeting and framing of objectives
2–4	Develop research specification and screening questionnaires for ethnography and focus groups and initiate the recruitment process
2–6	Technology research and design–engineering ideation
5–6	Conduct ethnography interviews and focus groups
7–10	Qualitative analysis; development of quantitative specification and questionnaire
10–14	Quantitative survey via mall intercept in five U.S. cities
14–18	Analysis of quantitative research, including segmentation on lifestyle and attitudinal variables
18	Strategic session to define strategic targets
18–22	Concept design based on segment targets
14–20	Concept refinement and preliminary engineering
18–24	Focus groups with target consumers to finalize design direction
24–30	Engineering
26–28	Focus groups to define final color and trim
31–40	Development of prototypes for use trial
38–44	In-home use trial of prototypes
44–46	Design transfer to Matsushita, Japan, for production engineering

relevant products and their aesthetic relationship, and their use. After the observation, the team used projective techniques to understand the variety of different situations when the user shaved, how these situations differed, and how the subject product performed in each of these situations. The team probed respondents' motivation for shaving, initially by asking respondents why they believed others shaved and then by redirecting respondents to discuss which of those reasons applied to them personally. The ethnography team brought a collection of different shavers with them and asked respondents to look at and to comment on each and then to actually use some in their own bathrooms. The ethnographic inquiry proceeded as planned, over a period of 60–90 minutes per respondent, with no resistance from respondents.

Insights gathered. The team learned that the respondents varied on motivation and involvement in shaving. Some respondents were highly involved in shaving, trying to achieve a closer shave, eliminating skin problems caused by shaving, or seeking a soothing and relaxing shaving experience. Other respondents thought of shaving as bothersome and as a necessary, but unsatisfying, chore. Based on getting to know the respondents through informal discussion in their homes, the research team later hypothesized that the various attitudes may be related to other lifestyle factors as well as to demographics.

This insight was subsequently validated by survey research, which identified a market segment with a strong predisposition both to the Panasonic brand as well as the wet–dry feature of the Panasonic product. Respondents in this segment—younger women in more urban environments—were the most highly involved with the shaving activity and shared a dominant set of particular attitudes and behaviors with respect to shaving associated with certain lifestyle activities (e.g., dating, going to nightclubs) and physiology (e.g., dark, coarse hair). The quantitative research indicated that this segment should be the primary target for the new product. Significantly, the design team—having earlier been exposed to the design tastes and attitudes of these women—was able to effectively reflect the aesthetic preferences of this youthful, urban market.

Although the research team observed respondents who used both Panasonic products as well as competitive products, none of the respondents used electric shavers in showers or other wet environments. When questioned about this during the home visits,

respondents frequently commented that they did not believe an electric shaver could be truly waterproof. They also expressed the fear that the shaver would crack, break, or damage the bathroom porcelain if dropped due to wet, slippery hands. The designer who participated in the ethnographic work later reasoned that the latter attitude was reinforced by the shiny, smooth, pearlescent plastic used in the construction of the existing Panasonic product. The shiny plastic, which communicated high quality to a Japanese consumer, was interpreted by U.S. consumers and designers as being fragile and slippery and thus not conducive to the shower environment. Accordingly, the designer specified that the new product have soft, rubberized, textured body that made the product more compatible with a wet environment, and less likely to slip from the hands or crack if dropped. This was a novel design choice at the time, as soft, rubberized materials had not yet been incorporated in products in either the electric shaver or razor market.

Other, more explicit factors derived from ethnographic observations and interviews also drove the new product design. The previous Panasonic electric lady shaver was hard edged and shaped like a rectangular brick. The designer, through observation, identified that this product was not visually and physically appropriate for a feminine personal care product. Therefore, she conceptualized the new product to be soft edged with a curvilinear form. The team also observed that respondents had difficulty in shaving areas around the ankle and behind the knee due to the angle of the shaving head of the electronic shavers used for this field study; users constantly had to reposition the shaver in their hand to achieve the optimum shaver position. The new design was uniquely shaped to allow the shaver to be properly positioned without repositioning the shaver in the hand. This novel ergonomic design departed from other products on the market in the angle of the shaving head. The design team also noticed that counter space was limited in the bathrooms they observed, and respondents were wary of more electronic products needing to be recharged, since frequently the only location in which to do this was on the overcrowded and often wet counter surface. Accordingly, the product was designed to include a compact charger that held the shaver at the wall outlet—off the counter and away from wet surfaces. In sum, the research team provided insights that led to several key innovations in Panasonic's product strategy for electric

shavers that can be used in wet bathroom environments. The Panasonic Lady Shaver product is shown in Figure 1.

Impacts from the ethnographic inquiry. The ethnographic research set the stage for effective follow-up quantitative market research while providing key insights for the subsequent product strategy and design. Observations of use in the wet-shaving environment led to the specification of novel materials decision for the body of the shaver, a key change in the shape of the shaver to accommodate ergonomic requirements, and a unique design for the shaver's charger to accommodate spatial requirements in the bathroom. The designers' first-hand awareness of perceptions about shavers and showers generated an argument for changing the appearance of the shaver from hard edged and shiny to curvilinear and soft, which turned out to have significant complications and implications for manufacturing. Finally, when the Panasonic engineers, located in Japan, reviewed videotapes of women shaving, they were amazed at how quickly the respondents shaved. Accordingly, they redesigned the shaving head to accommodate the pace of the shaving head across the skin, using a new technology for the shaving head that was not on hand at the start of the project.



Figure 1. Panasonic Lady Shaver

In sum, the findings from the ethnographic and follow-on research were compelling and resulted in significant improvement and differentiation of the product, which would have been difficult to achieve had the team not undertaken such a rigorous research program. If the Panasonic project had proceeded directly with traditional market research techniques, rather than beginning with ethnographic inquiry, these opportunities for product enhancement probably would have been overlooked or not supported by Panasonic's engineering team who traditionally opted for the status quo. Removed from the context of their product use, survey or focus group participants would have lacked important memory cues such as the spatial arrangement or constrained architecture of their bathroom, or difficulties, long buried in their subconscious minds, in using shaving products. Because the ethnographic inquiry transcended the language barrier and provided new design insights, the resulting product design was supported by all stakeholders at Panasonic. In particular, the Panasonic engineering team thoroughly understood and embraced the reasons for the dramatic change in product form and material and took ownership for implementing these design innovations.

The ethnographic research findings were valuable not only for product design but also for signaling the creative content for Panasonic's advertising campaign for the new lady shaver. The research team visited their client's advertising agency toward the end of the product development process, as product introduction became imminent. The agency utilized the research, and the resulting product strategy developed during the development process to generate ads that connected with the young, youthful target audience and their associated lifestyle. These ads depicted the targeted demographic, with coarse, dark hair, and connected with the motivation of romance that underpinned their mindset. Each advertisement and package included the byline "a shaver for women designed by women."

The identification of a segment of involved shavers during the ethnographic inquiry also directly influenced product positioning with recommendations by the design consulting firm for new opportunities for product channels, in-store placement, and packaging and merchandising strategies to appeal to the target market. The first production order of the new lady shaver was sold out when it was introduced at the Chicago Housewares Show and had an initial three-year product life cycle. After a two-year sabbatical

from the market, the product was reintroduced as originally designed with new package and a new placement strategy.

Case 2: Fishing Motors

Design firm selection, project timeline, and objectives. The client first learned of the design firm and of the technique of ethnography by attending a product development marketing conference where a representative of the firm presented on the topic of ethnographic research in product development. Within a few months, the client sent out a single request for proposal to the design firm, and soon thereafter the project was initiated.

The client's objective was to create the "perfect" new bow-mount trolling motor product line based on in-depth research with end users to develop a solid understanding of user wants, needs, and habits. They stated that their new product platform could begin with a "clean sheet" of paper for development but should benefit from lessons learned from their previous products. They sought an exceptional product concept that might serve as an opportunity for incorporating new technologies under their development. The new product platform had to address and accommodate the needs of the different market segments and provide a line of products that would meet or exceed user expectations. They acknowledged that this could be achieved either by a single universal product or with different products for each segment created through a modular approach efficient in terms of both fixed and variable product-related costs.

To create the ideal motor, the client recognized that it would be essential to fully understand the end users and consequently that their design consultant would need to be immersed in the fishing experience and to conduct in-depth research with target customers and key influencers. From this immersion, the consultant was to identify key needs; likes and dislikes; and perceptions with respect to the product's technology, appearance, size, weight, durability, and any other area of potential significance. They requested that the design consultant use the findings from this research to create concepts that satisfied the needs of all of the different stakeholders while creating a product family reflecting the existing quality image of the client's brand. The full research project included a review of emerging trends and technologies, the role played by channel experts in the purchase decision-making

process, and the implications of pre-usage and post-usage situations, in addition to the ethnographic inquiry. The ethnographic portion of this project was completed during a six-week period.

Objectives for the ethnographic interviews, consistent with their overall goals for the project, also were specified in advance in a joint effort involving the project manager, who was an ethnographer, and the client's technology design team. The client asked the consultant firm to include the following subsequent activities in the project: Follow up the interview phase by assembling and conducting innovation groups (i.e., involving them in the research through active listening exercises and moderated group discussions); collate and analyze the collected data; and create a report and presentation, using multimedia technology as appropriate, to map and summarize all key findings.

Buying behavior by the two targeted market segments had indicated preference for two different technologies for controlling the movement of the fishing boat. Open-water fishermen were enthusiastically adopting a new technology, whereas those who fish in shallow waters seemed to prefer an earlier technology. When combined, these two segments represented the majority of the market for the client's product. The client's goal was to utilize a single technology platform for steering and controlling the boat to meet the needs of both types of fishermen, thus creating efficiencies in manufacturing and distribution. Therefore, one key objective of the project was to understand the specific handling characteristics sought by each group and to create a specification for a single technology solution.

Ethnographic approach. The research team consisted of an ethnographer plus two lead designers, along with the client R&D manager, product manager, and marketing director. For each on-site interview, the ethnographer was accompanied by two of these other team members: one from his organization and one from the client organization. In preplanning for the ethnographic study it became clear that respondents were expected to ask the ethnographer and team members if they fished. Furthermore, being sensitive to the jargon and language used by this segment of the fisherman population was necessary for full involvement and learning by the team members. Because the research team had to be able to gain a high level of rapport with the respondents and to empathize with them through common language and experience, the

project leader selected team members who had actively participated in fishing as a hobby.

Preparation for the ethnographic study was particularly challenging in this project. The research team, composed primarily of individuals from northern states, was concerned that they may have difficulty being accepted and having access to individuals in the fishing subculture. Accordingly, on arrival in a rural region, the team spent time first with the local fishing pro and leadership of regional fishing clubs. Once the remaining respondents became aware of the affiliation of the team with these well-known and respected members of their culture, it was much easier to gain their acceptance. This turned out to be a critical factor in the success of the program.

Projective techniques were used to understand the variety of use scenarios that occur depending on fishing technique, time of day, and season. Respondents were requested to reenact scenarios of interest to the team including some that would not be the most desirable technique for the prevailing conditions. The ethnography team wished to gather observations that would lead to product design ideas for using technology to improve the amateur anglers' fishing experience.

By observing anglers of varying proficiencies, including professionals and amateurs, the team was able to observe the different uses of the fishing boat's trolling motor. The team observed that the professionals were very skilled at positioning the boat and made every cast more efficient, whereas amateurs had more difficulty positioning the boat and were not as efficient at placing their casts. Because they knew that much could be learned from careful observation of fishermen moving their boats into proper position in shallow water, where their quarry tended to congregate, these events were videotaped.

This project called for more than passive observation on the part of the research team. Not all of the team members had prior experience in the use of this equipment. It was essential that key members of the full design and development team be given the opportunity to have an empathetic experience with the product. Each member of the team joined a variety of professional and amateur anglers while fishing in their normal fishing environments. In addition to spending two hours observing and interviewing fishermen while using the product, each team member was provided an opportunity to use the products while fishing in challenging conditions. This empathic immersion experience led the team to appreciate the importance of sensory feedback information, which was received by

the user through the controls of the fishing boat equipment while attempting to effectively maneuver and position the boat.

Early in the course of this research, initial respondents were asked if the aesthetic of the device, which was mounted prominently on the deck of boat, was important. Their direct response was negative. However, the project team noticed that many respondents took great care to have the color scheme of their boats coordinated with their trailers and even with their trucks. Suspecting that there might be more to learn along these lines, the research team decided to add a metaphor technique to the subsequent interview protocols: Fishermen were asked to choose an automotive or other metaphor most similar to their boat. When the researcher applied the metaphor technique to explore the importance of aesthetics to product acceptance, respondents stated their image of their fishing boat was most like a Corvette, or their favorite brand of four-wheel-drive pickup truck. This type of response, when pursued further, led these respondents to state that it was important for their boats to look sleek and fast but also rugged. In addition, they stated that the existing device, mounted on the deck of their boat, in some ways added to this look but in other ways detracted from this look.

The field logistics of this project were especially difficult to coordinate. There was concern that a three-person observation team would crowd the fisherman on an 8-to-20-foot boat. Accordingly, the fieldwork was conducted at first with the researcher in the boat with the respondent while the remaining team members rode in a chase boat and listened to the interview through a two-way radio. The observers were not satisfied with this initial arrangement, as they could not witness all the details of the on-board interview, so after the initial three interviews the fieldwork was modified to allow the entire team to be in the respondent's boat. Although conditions aboard the fishing boat were then a bit crowded and respondents were more nervous at the beginning of the interview session, the research was more effective with the entire team being able to participate. The ethnographic inquiry otherwise proceeded as planned over a period of 90 minutes to two hours, with no resistance from respondents.

Insights gathered. The design team emerged from their ethnographic research with considerable empathic understanding of the end user's experience and, therefore, the critical design issues regarding

this special-purpose equipment. After spending two hours fishing with the respondent, the on-board observers noted that respondents typically complained of sore backs and legs, especially after longer fishing events. Their on-site experience also highlighted the importance of visible position indicators on the equipment as well as tactile feedback while operating it.

The design team also learned that though sensory feedback and quick maneuvering was critical to the shallow-water fishermen, it was not at all valuable to the open-water fishermen, who preferred to be able to effortlessly steer in a relatively straight course or on long, predetermined routes based on past fishing success. This latter observation led the design team to begin to question the value of designing their new equipment to be included within an existing product platform using a technology already adopted by open-water anglers that seemed inappropriate for controlling fishing boats used by shallow-water anglers.

Impacts from the ethnographies. The research team's observations and information provided on board by their respondents had direct implications for the new design. Findings about the ergonomic difficulties associated with the foot pedal led directly to improved designs of this equipment component for the new version of the product. The insight regarding respondents' almost tacit appreciation of the aesthetics of their fishing boat subsequently led the design team to shape their new equipment more in line with consumers' mental construct of an attractive boat. The manufacturer had not previously thought about market responses to such nonperformance attributes of their equipment.

The video recordings were helpful in communicating to the client's management team—who was not present for the ethnographic inquiry—key customer attitudes and needs. This allowed the management team to clearly understand respondents' perspectives and to avoid a strategic error in the planning of the new product. As mentioned already, the client had originally expressed the intention of using a boat-control technology that was already part of their product platform for other types of fishing contexts. The design team argued against this product strategy because the ethnographic study indicated that this technological choice would have the side effect of reducing the feedback felt by shallow-water anglers. The ethnography had shown that to embrace the existing technology would make boat handling more difficult for the user and that this would be an unacceptable

compromise in performance as perceived by the user. Accordingly, they proposed that a more appropriate control technology be adopted for this new product, even though this would sacrifice certain cost savings from retaining a common product platform with their other products. Without this empathetic ethnographic experience, it would have been difficult for the designers and the manufacturer's management to understand the importance and the specific nature of the perceived feel of the product through the controls.

The consultant's findings led their client to reject the strategic option to change all steering to the new technology. As a result, the client chose to continue on a path of making incremental improvements to the product instead of the major design change they had initially envisioned. Based on the results of the ethnographic inquiry, the client is pursuing modifications to the foot pedal for enhanced ergonomics, improvements in deploying and stowing the motor, and enhancements to the aesthetics of the motor.

Reflections, Analysis, and Lessons

This section steps back from the specifics of the case studies to reflect more generally on the variety of product-related insights that emerged from the ethnographies and associated lessons for conducting ethnographic inquiry in the front end. Additional observations from the review of 12 other ethnographic projects also are included.

Impacts of Ethnographies on Front-End Product Choices

As described in the introduction, ethnographic inquiry may yield insights well beyond what the researchers originally set out explicitly to explore. The present article's case studies have provided numerous examples of the general lesson that relevant information for product innovation does not always reside in the conscious mind of the respondent but, rather, is revealed through the direct observation of routine behavior where deeply ingrained attitudes and values influence action. Hence, a successful ethnography may call attention to design opportunities or implications that were not obvious at the outset but that arose instead by through appreciation of unconscious concerns or desires of the consumer. Accepting the notion of initial ambiguity helps ensure that such studies incorporate a broad coverage of potential

kinds of issues plus some time for serendipitous learning, which, as illustrated in the present cases, could be in the realm of ergonomics, aesthetics, product performance, and insights for new product strategy and marketing. It should be noted that in another of the studied cases, a field researcher's observation that respondents had trouble pouring a liquid cleaning product without any spillage led designers to introduce a more user-friendly package even though this was not included in the original design brief. In another of the studied cases dealing with a home repair product, the research team also gathered useful ideas for their client on innovation opportunities for helping consumers detect the source of related infrastructure problems in the home. See Table 4 for a list of unanticipated items of note in the two case studies presented here, along with insights from the cases.

Innovation Process Learnings

This article's case studies also supplement existing literature by suggesting specific process steps to include

before, during, and after ethnographic study. Appreciation for these steps will help innovation managers to effectively add ethnography to the front end of the product development process. It should be clear from the cases reported here that the omission of any of these steps can deplete the value of this field-based approach to identifying subtle and potentially important customer needs.

Planning Ethnographies

Start with an open mind. The unanticipated product design considerations noted in the two case descriptions are typical for well-executed ethnographic studies. Researchers should expect and desire to be surprised during ethnographies and must resist imposing initial constraints on field inquiry based on prevailing assumptions about the most critical elements for product innovation.

Screen for diversity in respondents. The number of respondents in design-oriented ethnographic studies is

Table 4. Lessons Learned from the Two Case Studies

	Lady Shaver Case Study	Fisherman Case Study
Unanticipated Ergonomic Considerations	Lady shaver users mentioned their latent fear of dropping a shaver if attempting to use it in a wet environment. Follow-up discussion with these respondents identified the source of this concern so that a design solution introducing a new material for the shaver body could be formulated.	Anglers were not conscious that their complaints of sore back and legs were related to poor foot-pedal ergonomics, so they would have been unlikely to offer redesign suggestions in a focus group on this subject. Nevertheless, reviewing videotaped on-board activity of anglers allowed this insight to surface and for suitable design solutions to be proposed.
Unanticipated Aesthetic Implications	An aesthetic trade-off became apparent in the case of the lady shaver product when the ethnographic research indicated that the existing shiny pearlescent plastic exterior was perceived negatively in use as being fragile and slippery.	Respondents in the fishing boat equipment case, when asked, denied that aesthetics played a role in their sport. But researchers gained visual cues in the field that suggested otherwise, leading to a more in-depth investigation of this subject and subsequent design decisions to offer appealing aesthetics to a product that originally appeared to be judged solely on performance considerations.
Unanticipated Product Performance Attributes	The charger for the new lady shaver product was designed to conserve counter space only after researchers observed limitations on such space in the bathrooms of respondents.	From their own hands-on empathic experience with the fishing boat equipment, researchers gained a sense of the importance of the quality of sensory feedback information provided to the shallow-water anglers by existing embedded control technology as they maneuver and position their boat. Prior to the ethnographies, the client organization did not fully appreciate the importance of the sensory interaction between the motor and the user.
Insights on Product Strategy and Marketing	The research team for the lady shaver product identified a new target market and was able to use their ethnographic insights to provide valuable product promotion ideas to the client's advertising agency.	The research team for the fishing boat equipment project presented strong and convincing arguments, based on direct experience in the field, that the client should modify the product strategy that they had specified in the original design brief.

relatively small. Take the time to identify respondent selection criteria that will result in exposure to different user situations. Even though the costs may be increased to study users in different geographic or socioeconomic settings rather than in a more restricted segment, the potential benefit comes from a deeper appreciation for varieties of customer needs, attitudes, activities, and environments.

Select a suitable ethnography team and provide needed advance training. The insights gained from ethnographies are only as good as the intuitions and observations of the team members. Key team members should have some familiarity with the general product category being studied and, to the extent that it is specialized, the culture of its use (e.g., women for the lady shaver product; fishermen for the trolling motor product). Skilled ethnographers can quickly develop a sufficient understanding of most product categories. Cross-functional representation is desirable to encourage diverse perceptions during the open-ended ethnographic process. If the responsibility for the ethnography is contracted to a consultant design firm, the on-site team should include key representation from the client organization to facilitate subsequent decision making based on ethnographic insights. The research team also may include members who are completely new to the category but who have strong intuition and a relevant professional background. Such team members may provide a non-traditional perspective and new solutions. However, the team should be kept small—that is, two to four people—so as not to overwhelm the respondents or to limit the observation possibilities.

Plan explicitly to gain access to the desired range of respondents. This process step is important when the product category forces ethnographic study with specialized consumers. It is worth the time and effort to improve accessibility by establishing formal or informal alliances with gatekeepers whose approval will be important in the eyes of the desired respondents (e.g., local fishing pro and leader of regional fishing club in the fishing motor case). In extreme cases, prior to contacting the selected respondents researchers should seek formal sponsorship from such individuals or organizations. The present review of three business-to-business contexts (see Table 2) indicate that additional complexities exist regarding access to relevant respondents; in such contexts the sample of respondents should include representatives from the

entire chain of influence in the purchase as well as use of the product. Often a brand-related emotional side of purchase and use of business-to-business products can be identified. Accordingly, using ethnography to surface such considerations by key stakeholders is an important predesign activity above and beyond estimating traditional price–performance trade-offs.

Conducting Ethnographies

Use multiple observation and inquiry techniques in the field. Each has its strength and should be considered. Insights may come from a variety of ethnographic approaches, often in combination with selected market research techniques. Still, time and attention constraints will limit what can be accomplished with respondents.

Modify the ethnographic guide as needed during the study. The guide may be revised during the study if the inquiry results in interesting findings that lead the team in a new direction or if certain methods or questions are either not fruitful or seem inappropriate with respect to a specific respondent. Recall in the case of the fishing motor that plans were changed to allow the entire team to be present in the respondent's boat.

Be flexible enough to probe for insights when surprises arise. Clues will appear based on observing the user in the natural context of use (e.g., Women were concerned about dropping their electric shaver in the shower; aesthetics mattered to fishing motor users). Not only must these be noticed, but such leads also must be used as the basis for follow-on exercises or discussions while still with those respondents. This is a very different style of inquiry from formal market research where, once designed and tested, surveys are routinely administered with no discretion or modification during the data collection process.

Act like a team in the field. The diverse set of expertise represented in the ethnographic team should be used. All of the researchers should be given the opportunity to observe and to question the respondents, and they should all be encouraged to reach their own conclusions as to what was learned and the associated implications for the forthcoming product design.

Capture relevant visual accounts. The desire is to be able to show the product design team key elements of product use or environment in the field. To some extent this is simply a more robust record than simply telling those who were not in the field what was observed. Designers will be able to work with ethnographic insights more effectively if they are able to see what was seen on the field. Furthermore, key decision makers who may resist acting on expressed insight if it conflicts with their own perception may be easier to persuade with the aid of such visual accounts. Recall the evidence needed to convince the lady shaver manufacturers to adopt a more expensive curvilinear body and the fishing motor client to abandon their single-platform technology strategy.

Leveraging Ethnographies

Conduct formal market research to probe and confirm ethnographic findings. Such market research is intended to provide key data on the market opportunities for the new product and to support a business case for proceeding to product development. When the ethnography is conducted early, before the market research, there is an important opportunity for the survey to focus on emergent dimensions that otherwise would have been overlooked. And some of the insights from the ethnography can be viewed as hypotheses, formulated within the survey design to be tested for validity across a larger sample of potential users. A sense of the variety and frequency of such hypothesis forming and testing is suggested in Table 2.

Engage in formal innovation activities where ethnographic findings are presented and where their meanings for product innovation are discussed. Decision makers will need exposure to what the field research team found. Implications of these findings may not be obvious and should be probed in predesign sessions. Innovation workshops were effectively used in several of the reviewed projects, including the fishing motor case.

Challenge original assumptions. Special care must be taken to confront initial assumptions about the product, customer requirements, and usage styles and cultures when conflicting information and insights are brought back from the ethnographic study. Existing product strategies, target markets, promotional activity, or even the value proposition for the product category may need to be revised in light of the ethnographic research. Decision makers need to be

willing to participate in this kind of activity to get maximum impact from new insights.

Apply insights for innovative product concept development. Remember that when, as in the investigated cases, ethnographic approaches are conducted early in the front end of the product development process, the product concept becomes the basis for a critical go–no-go decision with respect to subsequent development, testing, manufacturing, and market launch activity. The cost and time invested in planning, executing, and debriefing the ethnography will only be recovered to the extent that the resulting new product concept is more competitive because the ethnography was used by the concept developers and related designers—as in the two cases reported here. In general, being successful in such front-end integration activity will take special effort, especially in companies where product concept formulation is traditionally dominated by a specialist in either marketing or R&D.

Be attentive to both the costs and the potential benefits from ethnographic inquiry. In the reported two cases numerous insights from ethnographic discovery turned out to dramatically affect the resultant product design. In retrospect, given the magnitude of the subsequent decisions that were made, these client companies would have had no difficulty justifying the costs of the ethnography. Table 2 suggests that, in general, the cost (i.e., price paid to a design consultant firm) to design, implement, and analyze results from front-end ethnographic studies will tend to fall in the range of US\$15,000 to \$50,000, depending on the extent and depth of the investigation. New research methodologies aimed at lowering the cost of user research, while speeding the process and hopefully not sacrificing much depth, will continue to emerge (see, for example, Kumar and Whitney, 2003). Decision makers need to consider such costs within the broader context of the full investment cost of product innovation and introduction—including tooling for manufacturing of tangible products. Furthermore, they should view ethnographic research costs in the context of the potential impact of front-end ethnographic insights on product strategy, concepts, and design. The value of such research depends on the extent to which its aggregate impact on product innovation yields greater market acceptance and associated revenue and profit streams than would have occurred through product innovation in the absence of front-end ethnographic inquiry. Admittedly, it may be difficult in

advance to make this formal calculation based on confident projections. Sensitivity studies employing a variety of assumptions may be useful here. Nevertheless, decision makers should view the cost–benefit of any ethnography in terms of the potential for important discovery, innovative product strategy and designs, and financial and competitive impacts over the life of the new product and perhaps beyond.

Using Design Consultants or Deciding Not to Do Ethnographies

The present article's cases offer lessons on the special role of the product design and development firm in ethnographic work. In certain respects external product design and development firms have a comparative advantage in adopting this approach in comparison to their business clients: (1) they tend to question decisions or constructs held firmly within the client organization, thus broadening the potential scope of innovation; and (2) they are often more experienced in fieldwork and the use of intuition in search of opportunities for new product ideas than their clients.

Finally, this research offers some insight to the question, When is formal ethnographic inquiry not likely to be applied? In addition to the 14 projects referenced in Table 2, a set of ethnographic proposals rejected by potential clients also was reviewed. Product-related ethnography is not for everyone and seems to be especially likely to be rejected when a company

- believes it is already immersed in the culture of its customers through frequent participation, and possible sponsorship, of customer-oriented events (e.g., the sporting goods or fashion industry)
- decides to align product design decisions with preferences of selected acknowledged experts whose sponsorship is expected to determine the wants and needs of customers (e.g., Nike)
- has clearly defined a product strategy and is already committed to a product definition that is well aligned with their strategy, based on preexisting knowledge of target customers
- lacks the resources to invest in formal ethnographic inquiry and decides instead to simulate such research at little or no cost by using employees as surrogate customers
- offers a product essentially invisible to the customer or contains no user interface (e.g., technology components or medications)

Note that for all but the last of these situations formal ethnographic inquiry might indeed add some value, but the benefits are often prejudged as low relative to the required investment of funds and time.

Conclusions

A growing awareness of the limits of basing product innovation decisions on listening to the voice of customers has led to new research-based techniques. Interview methodologies have been identified for turning outcome-based customer input into innovation concepts (Ulwick, 2002). Ethnographic studies of consumers provide insights on unarticulated needs. The present exploratory research on ethnographic studies in support of the front end of new product development has identified potential opportunities and possible pitfalls. These findings have direct implications for managers who wish to employ this approach either through their own internal staff—as part of an evolution of a design-inspired enterprise (Lojacono and Zaccai, 2004)—or, as in the cases studied, through an outside design and development firm.

In either event, it appears that the following organizational capabilities and competencies are needed for successful implementation of ethnographic approaches: (1) an interviewer trained in ethnographic techniques; (2) video, still photography, or audio recording capability (Video is not always feasible or desirable, given legal or financial constraints or considerations of privacy, or respondent culture. HIPA laws, for example, inhibit the use of video in doctor's offices and hospitals.); (3) ability to recruit informants and to organize field research; (4) skills to review and edit audio or video data; and (5) a commitment to the research process. Improving the process of front-end product innovation management also calls for the ability to translate research findings into specific product strategies and design concepts.

The present findings provide a foundation for more in-depth investigation of the costs and benefits of a variety of ethnographic approaches at various stages of the product development process and for services as well as tangible products. Being able to effectively integrate ethnographies into the innovation process could prove as fundamental to future innovation success as more traditional quests for synergy between marketing and research and development (Rein, 2004).

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Appendix. Research Method and Limitations

This exploratory research is based on in-depth retrospective study of two cases where a product design and development firm engaged in ethnographic research early in the life of a product innovation project. These case studies of tangible products involved review of existing documents (i.e., project plans, memos, and designs) and interviews with principals from that project. The purpose of each case study was to create a concise summary of the objectives of the project, the approach employed, participants in the research, the insights generated, and their impact on product innovation and related decisions. These two cases were chosen to highlight important innovation issues informed by ethnographic inquiry: identification of target market segments and product strategy. Twelve other ethnographic projects (see the summary data in Table 2) also were reviewed as an additional basis for offering a set of generic observations about the potential and pitfalls of ethnographic research as a basis for better understanding the needs of customers and improving product design and strategy decisions. The face validity of these concluding observations was tested by having them reviewed by several professionals in the field of ethnographic research. This convenience sample is suitable for exploratory research. There is no claim that the sample is representative nor that the implications for practice are fully formulated.