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An Implementation of the Lead User Market Research Method in a "Low Tech" Product Area: Pipe Hangers

Cornelius Herstatt* and Eric von Hippel**

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MASSACHUSETTS
INSTITUTE OF TECHNOLOGY
50 MEMORIAL DRIVE
CAMBRIDGE, MASSACHUSETTS 02139

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* Swiss Federal Institute of Technology, Zurich, Switzerland
** MIT Sloan School of Management, Cambridge, MA USA

Abstract

Implementations of the lead user market research method reported on to date have focused on product areas where many users could be expected to have a high level of technical training and skill. But it is quite possible that many or all users of a given product type are not technically skilled, and it would be useful to know if the lead user method can be applied under such conditions.

In this paper we report on a lead user method case carried out in a product area characterized by users with only a low level of technical training. In this case, we did find that we were able to identify a set of highly innovative lead users. And, in joint product development work with a manufacturer, these users proved able to provide detailed new product concepts judged to be of great commercial value. The manufacturer who cooperated in this case study also provides anecdotal evidence that the lead user method is significantly faster and cheaper than methods previously used.

1.0: Introduction

Findings from innovation research provide clear evidence that successful product development requires an accurate understanding of user needs (Geschka 1989, Rothwell, 1974). In a recent study of the market research preferences and practices of a sample of 156 small, medium and large Swiss machinery and tool manufacturing firms, Herstatt (1991) found that methods which engage manufacturers and users in joint product or service concept development were judged to be the most effective type. At the same time, he found that such processes were seldom used, because they were viewed as very complex, costly and difficult to implement. In 1986 von Hippel proposed a "lead user" market research method that involves joint product concept development work between manufacturers and selected "lead" users who have an especially sophisticated understanding of their needs.

Implementations of the lead user method reported on to date have focused on product areas where many users could be expected to have a high level of technical training and skill. Thus, Urban and von Hippel (1988) report on the development of product concepts for process equipment used in the electronics industry, and Bailetti (1990) reports an application in advanced telecommunications products. But many products, even technically sophisticated ones, do not require technical sophistication on the part of their users - for example, very little technological understanding is required to operate a microwave oven. And under such circumstances it is quite possible that many or all users of a given product type are not technically skilled.

It therefore seemed to us to be useful to try out the lead user method in a product area characterized by users with a low level of technical training.

in order to begin to learn whether users in such fields are capable of carrying out the product concept development role that the method specifies for them. If they can, the lead user method will potentially be applicable to many (most?) product and service categories characterized by rapid change.

The lead user market research case study we report on here was carried out in a product area, "pipe hangers", (the hardware used to attach pipes to the walls and ceilings of buildings) where the technical education of users in general and thus, presumably, of lead users, was known to be moderate. This test was conducted with the aid of HILTI AG. As the reader will see in the remainder of this paper, this test was successful in two important ways.

- First, the lead user method as applied did prove very successful at developing valuable new product concepts even in a field characterized by "low-tech" users. That is, a set of highly innovative lead users were identified, and they proved able to provide the manufacturer with detailed new product concepts that the manufacturer - and more routine users - judged to be of great commercial value. Also, the firm studied found the method to be both faster and cheaper than methods previously used.

- Second, the application of the lead user method did show that it was able to perform well in creating strong contact between lead users and market and product design specialists. (An additional unexpected but welcome consequence was that the firm studied judged that teamwork between its product development and the market research functions was improved in general as a result of participation in the joint analyses specified by the method.)

Of course, the reader must keep in mind that our findings in this case study can provide only a single data point with respect to the matters we examine.

In the remainder of this paper we first (section 2) briefly review the four major steps involved in carrying out a lead user market research study. Next, (section 3), we describe the product/market context of this study. Then, (sections 4-7) we detail how we carried out each of the four method steps in the instance of this particular study, and our findings related to each. Finally, (section 8) we discuss the implications of our results.

2. The Lead User Market Research Method

"Lead users" of a novel or enhanced product, process or service have been defined (von Hippel, 1986 p.796) as those who display two characteristics with respect to it:

- They face needs that will be general in a marketplace - but face them months or years before the bulk of that marketplace encounters them, and

- They expect to benefit significantly by obtaining a solution to those needs.

Thus, a manufacturing firm with a current strong need for a process innovation which many manufacturers will need in two years' time would fit the definition of lead user with respect to that process.

Each of the two lead user characteristics specified above provides an independent and valuable contribution to the type of new product need and solution data lead users are hypothesized to possess. The first is valuable because, as empirical studies in problem-solving have shown (summarized in von Hippel, 1986), users who have real-world experience with a need are in the best position to provide market researchers with accurate data regarding it. When new product needs are evolving rapidly, as in many high technology product categories, only users at the "front of the trend" will presently have the real-world experience which manufacturers must

analyze if they are accurately to understand the needs which the bulk of the market will face soon.

The utility of the second lead user characteristic is that users who expect high benefit from a solution to a need can provide the richest need and solution data to inquiring market researchers. This is because, as has been shown by shown by studies of industrial product and process innovations (Mansfield, 1968), the greater the benefit a given user expects to obtain from a needed novel product or process, the greater will be his investment in obtaining a solution.

In sum, then, lead users are users whose present strong needs will become general in a marketplace months or years in the future. Since lead users are familiar with conditions which lie in the future for most others, the lead user market research method can help manufacturers acquire need and solution information that will be useful in the development of concepts for 'next generation' concepts for new products and services.

A lead user market research study involves four major steps:

(1) Specify Lead User Indicators

A. Specify an important trend or trends:

Lead users are defined as being in advance of the market with respect to one or more important dimensions which are changing over time. Therefore, before one can identify lead users in a given product category of interest, one must specify a trend or trends on which these users have a leading position.

B. Specify measures of potential benefit:

High expected benefit from solving a need is the second indicator of a lead user, and measures or proxy measures of this variable must also be defined. (One useful proxy: evidence of product development or product modification by users. As noted earlier, user investment in innovation, and user expectations of related benefit have been found to be correlated.)

(2) Identify Lead User Group

Once trend and benefit indicators are specified, one may identify a lead user group among those that display both criteria. Such a group will be at the leading edge of the trend being studied and will display correlates of high expected benefit from solutions to related needs.

(3) Generate Product Concept with Lead Users

Once a group of lead users has been identified, company engineering and marketing personnel can work together with them to develop valuable product concepts. Creative group sessions can be used to pool user solution content and develop a new product concept.

(4) Test Lead User Product Concept

The needs of today's lead users are not necessarily the same as the needs of the users who will make up a major share of tomorrow's predicted market. Therefore, a final step in the lead user market research method is to test whether concepts found valuable by lead users will also be valued by the more typical users in the target market.

3.0 The Product and Market Studied

The company we elected to focus on in this study was HILTI AG. HILTI is a leading company worldwide in the fastening-related products. The firm was selected for the study because it was interested in cooperating and, while many of its product lines are very technically sophisticated and/or place high demands on users, it also had product lines which suited our study requirements.

The product line we elected to focus on was pipe-hangers. These are assemblages of steel supports and pipe clamps and other hardware components that are used to securely fasten pipes to the walls and/or ceilings of buildings. Sometimes pipe hangers can be quite simple and support only single pipe. Frequently, however, they are relatively complicated structures that simultaneously support and align a number of pipes of different sizes and types (figure 1).

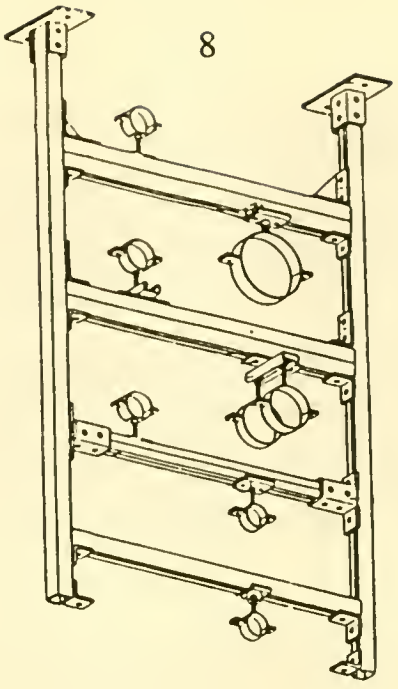

Figure 1: A Conventional Pipe Hanger Configured to Support Several Pipes

The firms that install pipe-hanging systems are specialists in installing pipe networks in commercial and industrial buildings - for example, industrial plumbing firms. Installation of pipe hangers is a subtask in the larger task of pipe installation.

Importantly for the purposes of our present study, the tradesmen who actually install pipe hangers have only a moderate-level technical education. In the countries from which our user sample was drawn - Switzerland, Germany and Austria, these installers have completed 8 years of general schooling, and then have taken a two or three-year vocational training program in their particular trade. Finally, they have passed a municipal examination and received a license to practice.

4.0: Identification of Lead User Characteristics

Recall that lead users of a product, process or service are defined as those who display two characteristics with respect to it: (1) They have needs which are advanced with respect to an important marketplace trend(s); (2) They expect to

benefit significantly by obtaining a solution to those needs. In order to identify lead users of pipe hanging hardware, we first needed to identify important trends and users with relatively high benefit expectations related to these.

4.1 Identification of Trends: Methods

To identify important trends in the evolution of user needs in pipe hanging hardware, we conducted a survey of experts. A brief analysis of the target market showed that people with expert knowledge in the relevant field would be found among "layout engineers", the specialists in charge of planning complex pipe networks in commercial and industrial buildings. (Layout engineers also are key decision-makers with respect to determining which components will be bought and used for the pipe networks they design.)

Expert advisors for this study were found in construction-departments of technical universities, professional engineering organizations, and municipal departments responsible for approving the design of pipe networks. Some of these were already known to the HILTI R&D department, others were identified via recommendations. Ultimately, the panel of experts who provided information for this study consisted of eight leading layout engineers in Switzerland, Germany and Austria; two researchers from the construction departments of the Swiss Federal Institute of Technology and the University of Darmstadt (Germany); one engineer from the professional organization in Bonn (Germany); and one engineer each from the municipal building departments in Bern (Switzerland) and Berlin (Germany).

4.2: Identification of Trends: Findings

The trends identified as most important by the experts surveyed regarding pipe hanger systems were as follows:

(1) There is an increasing need for pipe hanger systems that are extremely easy to put together - so easy that instruction booklets will not be needed: Such systems should have significantly fewer components than at present. They should adapt to a wide range of application conditions, and should be based on a simple, consistent construction principle.

(2) There is a need for rapidly actuated, positive, interlocking fasteners to connect pipe hanger elements, and to attach the hangers to building walls and ceilings. (The multiple screws and bolts now used to assemble hangers (cf figure 1) are time consuming to use - and some may be inadvertently overlooked by installers working under difficult field conditions.)

(3) There is a need for pipe hangers made from lighter non-corrodible materials. Pipe hangers should therefore increasingly be made of plastics rather than of the steel elements that are used almost exclusively today.

Solutions along these (somewhat overlapping) dimensions were expected to result in lower costs for the user of pipe-hangers. Fewer components would have to be stocked by users; speed and convenience of installation would be greatly increased; and the skills required of installers would be reduced.

4.3: Identification of High Benefit Expectations: Methods

Expectations of innovation-related benefit on the part of users can be identified by survey, and this approach has been successfully applied elsewhere (Urban and von Hippel, 1988). However, as mentioned earlier, innovation-related activity by users can also serve as a proxy for expectations of benefit, and this is the approach we used here.

We identified users showing the proxy for high expected benefit (innovation activity) by conducting telephone interviews with a sample of 74 interviewees. Since, as will be described in the next section, the same sample was screened to simultaneously identify users having both lead user characteristics: (1) ahead with respect to identified trends and (2) having high expected benefit,

we will defer a detailed discussion of methods and findings with respect to user innovation activity until section 5.

Here, we simply note that users engaged in innovating were determined by questions such as: "Do you / did you ever build and install pipe-hanger hardware of your own design? Do you / did you ever modify commercially available pipe hanger hardware to better suit your needs?" We also note that a high fraction of users interviewed (36%) were in fact found to display this characteristic.

5.0: Identification of Lead Users

Once we had identified the trends and the user benefit characteristics that we would use to identify lead users, our next step was to identify a lead user sample.

5.1: Identification of Lead Users: Methods

Our process of identifying lead users began by identifying, in cooperation with HILTI, a random sample of firms that buy and use pipe hangers. Then we screened this sample to identify a subset of lead users within it.

HILTI has a number of geographically-based sales divisions with close and frequent customer-contacts. We asked the German, Austrian and Swiss sales divisions (selected because of their geographical accessibility) to provide us with the names of firms who they thought were buyers of pipe-hanger systems made either by HILTI or HILTI competitors. In our request we made no mention of either customer innovativeness or customer size. The three sales divisions eventually responded with the names of 120 firms they thought met the criteria.

We next attempted to contact all 120 user firms for a telephone survey. Ultimately, 74 of these were in fact successfully contacted and judged suitable for and willing to undertake more detailed interviews (20 of the 120 were excluded because they could not be reached after 5 telephone calls. An additional 16 were excluded because they were found not to be currently using the product type at

issue. A final 10 were not included simply because they were not willing to participate in an interview).

In the instance of the 74 firms who were willing to participate in our telephone interview, we next sought to identify the most expert person on the products under investigation. To do this, we asked our first contact at each firm, "Who do you regard the most expert person on pipe-hanger systems in your company, and can we talk to that person?" In the event, we were referred to expert "fitters" - employees who actually install pipe-hanging systems in the field - in 64 of the 74 instances. In the remaining 10 cases we were referred to direct supervisors of fitters, all of whom had moved into supervisory positions only after extensive experience in the field.

Interviews were next conducted with all of these 74 individuals. Our interviews were aimed at identifying a subset of users in our sample of user who had both of the two lead user characteristics: (1) being ahead on the trends identified by our experts and (2) who expected high benefit from innovations along these dimensions.

The proxy we used for "ahead on identified trends" was simply (1) did the interviewees agree that advances along the trends that had been specified by our expert panel were in fact needed and important and (2) could the interviewees describe at least some technically interesting ideas regarding these trends. As we noted in section 4.3, the proxy we used for user innovation benefit expectations was - had the users developed or modified pipe hangers in ways that they felt represented improvements with respect to the identified trends.

5.2: Identification of Lead Users: Findings

As a result of our interviews, we were able to identify a significant number of lead users of pipe hanging hardware. Our findings on this matter are summarized in table 1 and, as a matter of interest, compared with data drawn

from the Urban and von Hippel study of PC-CAD users. In both studies, there was a high overlap between users displaying the two lead user characteristics.

Sample of Pipe Hanger Users	Sample of PC-CAD Users*
Users at front of selected trend(s):	
30% (22)	28% (38)
Users who built own prototype products:	
36% (27)	25% (34)

*Data Source: Urban and von Hippel (1988), Table 1

Table 1: % of sample found to have lead user characteristics in two studies

Recall that a central question addressed by this study was whether innovating users exist in fields where users do not have advanced technical training. It is therefore very interesting to note that, as is shown in table 1, fully 27 (36%) of our random sample of users of pipe-hanging systems had designed, built and installed hangers of their own devising in one or more cases. This compares very favorably with the 25% of innovating users found in the technically-sophisticated field of PC-CAD.

6.0: Lead User Product Concept Development

We had now found that a group of users existed in the field of pipe hangers that met the criteria for lead users. Our next task was to determine whether a group of these lead users could be joined with expert HILTI personnel to produce novel product concepts that would be judged by HILTI marketing researchers and by routine users to be the basis of valuable commercial products, and that would be judged to be practicably manufacturable by HILTI engineers.

6.1: Selection of Lead User Concept Group: Methods

In the previous step we had identified a group of 22 users who met our lead user criteria among our total user sample of 74 users. We next applied two more tests to our subsample of lead users to select a small group who would be invited to join with HILTI engineers and other experts in a three-day concept generation workshop. These additional tests were intended to select the users most likely to be effective in such a workshop, and consisted simply of the judgement of the person who had interviewed the user on two matters: Did the interviewer judge that the user could describe his experiences and ideas clearly?; Did the user seem to have a strong personal interest in the development of improved pipe hanger systems? Fourteen of the 22 lead users met these additional tests and were invited to join the workshop.

6.2: Selection of Lead User Concept Group: Results

Twelve of the 14 lead users we contacted - 10 pipe fitters plus 2 supervisors of fitters - agreed to join our product concept development workshop. Interestingly, the two that did not were users who had patented their own pipe hanger system designs. These two were not willing to present their ideas in a work-shop, most probably because they feared the diffusion of their technical know-how to HILTI or other users.

All users who joined the workshop formally agreed that any inventions or ideas developed during the sessions would be the property of HILTI. As compensation, every participant was offered a small honorarium. Interestingly, most of the participants did not accept this; they felt sufficiently rewarded by simply attending and contributing to the planned workshop.

6.3: Product Concept Generation Workshop: Organization

The goal of the product concept generation work-shop, sponsored by

HILTI, was to develop the conceptual basis for a novel pipe-hanger system with characteristics identified in the technical trend analysis described earlier. In order to most effectively meet this goal and in order to efficiently transfer the workshop findings to HILTI, the lead users at the workshop were joined by two of the expert layout engineers who had participated in the trend analysis segment of our study. Also, we invited from HILTI the marketing manager, the product manager, and three engineers who worked for HILTI on the design of the fastening systems under study.

The workshop was carried out over a three day period, and was organized as follows:

- On day 1, the entire group conducted a review of important trends and problems in pipe-hanging systems. Next, five relatively independent problem areas were defined by the group[1], and a subgroup was established to work on each. Membership in the subgroups was at the option of workshop participants, and shifts in membership were made from time to time to avoid the possible danger of premature fixation on individual problem-solving ideas championed by individual users. Each of the subgroups was assisted by technicians from HILTI or external layout engineers.

- On day 2, the five subgroups worked on their problem areas in the morning, and in the afternoon all took a break from the specific problems at hand and participated in some general problem solving and creativity exercises.[2]

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[1]These were: (1) methods of attaching pipe-hangers to ceilings or walls; (2) design of support elements extending between wall attachment and pipe clamp itself; (3) the design of the pipe clamps; (4) design of the methods of attaching various system components to each other in the field; (5) method of conveniently adjusting length of supporting members at the field site.

[2]In addition to formal working sessions, we built a lot of creativity supporting exercises into the lead user workshop. Among these were role-playing where, for example, users would act out the role of sales people as they saw it; team-building exercises; discussions about future developments in the product area under investigation - and simple relaxing. We did this for two reasons. First, we were convinced that good solutions could not be forced by pressure, and second, we wanted the participants to become comfortable with each other. (The second was

- On day 3, the subgroup ideas were presented to the entire group for evaluation[3] and suggestions. Then, membership in the subgroups was changed, work on the most promising concepts was continued, and informal engineering drawings were produced by participants. Finally, these were critiqued and modified by the entire group and merged into one joint concept.

6.4: Product Concept Generation Workshop: Results

At the conclusion of the workshop, the single pipe hanger system design selected by the total group as incorporating the best of all the elements discussed in the subgroups, and this was the system recommended to HILTI.

After the workshop, the technical and economic feasibility of the new product concept proposed the lead users was evaluated further by HILTI personnel. At the conclusion of this work, it was decided that the lead users had indeed developed a very valuable new pipe-hanger system. In the judgement of company experts it was well in advance of the offerings of competitors. It involved fewer components (e.g. only one sort of clamp for all pipe sizes); it used both steel and plastic components instead of only steel (some steel was required by building codes); it incorporated a completely novel assembly method that did not use screws or bolts, and that was judged to be much easier and faster for users to assemble in the field. Finally, the lead user system involved a different and better way of fastening the pipe hanger hardware to all kinds of building surfaces and materials without the use of drills, plugs or screws.

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especially important because of the different educational and social backgrounds of the participants). After a short while and some "ice-breaking" activities, we found the workshop to be characterized by a very strong group cohesion and intensive, cordial interaction.

3 As an aid to this evaluation effort, each of these 5 solution elements were evaluated on the three criteria of *originality* (how revolutionary and novel is the solution from a technical point of view?), *feasibility* (how quickly can the solution be realized employing currently available technology) and *comprehensiveness of solution* (does the idea represent a single solution or does it resolve several user problems simultaneously?)

7.0: Market Test of Lead User Concept: Methods

The fourth and final step in the lead user market research method involves testing whether routine users in a marketplace find the product or service concept developed by lead users to be attractive. Because HILTI's internal evaluation showed the potential commercial value of the lead user concept to be very high, they were not willing to present it to a random sample of ordinary users for evaluation. (They feared that details might also leak out to competitors.)

As a result of this concern by HILTI, we decided to simply test the lead user product concept on a sample of 12 "routine" users. The companies selected for this "routine user" sample were drawn from our sample of 74 interviewed companies. The sample selection criteria were that our interview data showed them not to be lead users, and also that they must have had a long, close relationship with HILTI. (The latter requirement was added because the company wished to have confidence that these users would be willing to honor a request to keep the details of the new system secret.) The interviewees selected were buyers as well as users: They had the dominant role in the purchasing decisions of their own companies with respect to pipe hangers.

7.1: Market Test of Lead User Concept: Results

We asked our sample of 12 user-evaluators to review the proposed pipe-hanger system in detail, noting particular strengths and weaknesses. Their response was very positive. Ten of the 12 preferred the lead user product concept over existing, commercially-available solutions. All except one of the 10 expressed willingness to buy such an pipe-hanger system when it became available, and estimated that they would be willing to pay a 20% higher price for it relative to existing systems.

As a result of the very positive internal and external evaluations of the lead

user product concept, HILTI has decided to go ahead and develop it into a new product line and is, at the time of writing, engaged in tooling up for production.

8.0: Discussion

In this case study, we found that the lead user method worked well in a relatively "low tech" product category whose users were not characterized by advanced technical training. A significant fraction of all users sampled were found to have lead user characteristics. A group selected from among these proved very effective in working with company personnel on new product concept development: They did in fact develop a new system judged to be very valuable by both the manufacturer and a group of non-lead users.

In this case study, we also found that the customer's perspective never got lost at any stage of the process: The "voice of the customer" was always clear and immediately available to all who were involved with the project. This seems to us to be a very useful aspect of the lead user approach. It also creates a useful input for Total Quality Management (TQM) and Quality-Function-Deployment (QFD) methods, by pointing out which "voice of the customer" to focus on. (This advantage is not lost on HILTI personnel, who are already beginning to use Lead User inputs for this purpose.)

An additional, unanticipated result of the lead user method was an observed improvement of teamwork within HILTI, manifested in a significant improvement in the level of cooperation between the technical and marketing groups in the company. One reason for this was apparently that the teamwork built into the lead user method had a carry-over effect. Also, since, product and performance requirements of innovative users were immediately translated into language meaningful to both engineers and marketing people, a shared language was created that made further cooperation easier.

8.1: Estimated Time and Cost Savings

Interestingly, HILTI personnel informed us that it appeared to them that the lead user method, beginning with a technological trend identification and ending with a novel product concept, was significantly faster and cheaper than the more conventional marketing research methods they normally used. We did not have the data to test this observation rigorously, but we did compare the time and costs expended in this first lead user study by HILTI with the time and costs expended on a project which they had recently conducted, and which they judged to be of very similar scope and complexity.

The process conventionally used by HILTI took a total (elapsed time) of 16 months from start to final agreement on the specifications of the product to be developed, and cost $100,000. The work began with marketing personnel collecting and evaluating data on needs and problems from customers (5 months; $56,000); then marketing explained to engineering what it had found, and these two groups jointly developed tentative product specifications (2 months; $5,000). Next, engineering went off on its own to develop technical approaches to meeting the agreed-upon specifications (4 months; $23,000). Then, engineering got together with marketing to evaluate and adjust these (3 months; $10,000). Finally, both engineering and marketing wrote up a formal product specification and submitted it to management for formal approval (2 months; $5,000).

In contrast, the lead user method took a total (elapsed time) of 9 months and cost $51,000 from the start of work to final agreement on the specifications of the product to be developed. In this instance, the major steps were all conducted by a project group headed by the manager of the pipe hanger product line. The group membership consisted of two development engineers, and two market specialists. One of the latter was responsible for pipe hangers specifically, and one was a market research methods expert from HILTI's central market research group. The steps carried out by this group (and described in

detail earlier in the paper) were: Survey of experts (2 months; $9,000); telephone survey (2 weeks; $8,000); Lead User Workshop (3 days; $24,000); internal evaluation of lead user concept (3 months; $4,000); concept test on routine user group (2 months; $4,000); writing of formal product specification submission to management for formal approval (2 months; $2,400).

In sum, we found that the lead user method consumed only 56% of the time used for the project put forward by HILTI as comparable. In our estimation and that of HILTI personnel, the reason for the time saving appeared to lie mainly in the systematic, parallel involvement of engineers, marketing people and highly qualified users - as opposed to the serial involvement of these groups used in the earlier method. Because of this, time consuming feed-back loops or re-considerations, often produced by misinterpretations or information-filtering in the serial method, were avoided.

The cost of the lead user process was also found to be significantly lower than market research methods previously used by HILTI (approximately 50%). Our informal evaluation of the reasons for this conducted with HILTI personnel suggests that the cost saving had two principal causes. First, the costs for customer surveys were smaller in the lead user method. (In the lead user project, only 12 selected users were involved in joint, face-to-face discussions. In the conventional project approximately 130 interviews with a randomly-selected group of users, each involving face-to-face visits by HILTI personnel, were carried out in three different countries.) Second, the solutions provided by the lead user group required less work on the part of HILTI technical departments than did the ideas provided by marketing researchers in the conventional method. (In the lead user project, people from HILTI technical departments had direct user contact and had been involved in concept development from the start. They therefore had richer data regarding user needs in the lead user project than they did in the conventional project.)

8.2 Some Common Practical Problems - and Proposed Solutions

Although the lead user method worked well in this case study, the reader should note that it is still a very new method. Details of method application will appropriately differ from study to study - and we are all still learning. Some practical problems that have been observed by people who have experimented with lead user market research - and some solutions that have been found to be effective - may prove to be of interest.

First, what do you do if you cannot identify a trend(s) in the product/market segment of interest? A method that has been shown to work in such a case (Bailetti, 1990) is to seek out innovating users first (these have the second-listed characteristic of lead users - expectations of high benefit). Then, manufacturer personnel can work out the relevant and important market trends by working together with some of these innovating users.

Second, what can you do if there appear to be no existing lead users of a given product or service with the type of information you are looking for? (For example, when the industrial chemical division of HILTI tried to work on new devices for insulating materials (insulating foams) together with some users of their products, they found that the selected users were not capable of delivering sophisticated data: they lacked the necessary, technical and chemical knowledge to do so.) In such a case, recall that users will innovate only when they expect sufficient benefit from doing so, and extend the search for lead users beyond users of the specific product type you are studying to analogous product types. You are likely to find the lead user information you need among some of these. (For example, many useful ideas for consumer power tools come from lead industrial users of similar tools. Industrial tool users often expect higher benefits from a given innovation than home tool users would expect.)

Third, what do you do if some of the lead users you identify do not wish to

provide information to you? (Recall that in the HILTI case study, we did encounter two innovating users who had already patented their own innovative devices and were not willing to participate in the lead user workshop.) This concern is often raised by those who have not yet applied the lead user method, but we have never seen it to be a real problem in practice. We have always found that a useful number of lead users can be found who do wish to cooperate, and have found that the inputs of those not willing to participate is therefore not essential.

Finally, what happens if the novel product concept identified by a lead user group is not feasible for some reason? There are generally three causes for such an outcome - all avoidable: (1) The product concept is not realistic from a technical point of view; (2) it cannot be manufactured to be sold for a price acceptable to the market, or (3) because it is not of interest to normal or average users. To minimize the risk of encountering any or all of these problems later in the lead user concept generation process, it is essential to integrate R&D and marketing people into the concept generation project from its beginning. Proper management of the concept generation work will allow these experts to help lead users avoid problems not within their areas of expertise while, at the same time, encouraging lead user creativity.

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