

**A Lead User Study of
Electronic Home Banking Services:
Lessons from the Learning Curve**

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ABSTRACT

The lead user method for identification of new product and service concepts is built around the idea that the richest understanding of new product and service needs is held by "lead users." Such users can be systematically identified, and the information they hold can be used for purposes ranging from new product and service development to the development of corporate strategy.

Product and service concept development methods that incorporate inputs from lead users are currently being adopted by a number of companies. In this article we report on the successful use of the lead user method in the field of electronic home banking services. Methods used in this case study are described in detail, and four general "lessons from the learning curve" with respect to lead user method practices are presented in a final discussion section: (1) the value of identifying lead users via a networking process rather than by surveys of likely user populations; (2) an "innovation first" approach to lead user identification; (3) the value of understanding lead user systems when developing new product and service concepts; (4) learning from vs. adopting lead user innovations.

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1. Introduction

Users selected to provide information to developers of new products and services have an important limitation: Their insights into needs and potential solutions are constrained by their own real-world experience. Users steeped in the present are thus unlikely to generate novel product and service concepts that conflict with the familiar.

In many product categories, the constraint of users to the familiar does not lessen the ability of marketing research to evaluate needs for new products by analyzing typical users. In the relatively slow-moving world of many consumer products, for example, 'new and improved' models often do not differ radically from their immediate predecessors. And, when the "new" is reasonably familiar, typical users can play a valuable role in characterizing the need for new products. In contrast, in fields strongly affected by high technology, the world can change so rapidly that the related real-world experience of ordinary users is often rendered obsolete by the time a product is developed or during the time of its projected commercial lifetime. For such fields, it has been proposed that inputs from "lead users" are essential to the product and service development process. Although the insights of lead users are as constrained to the familiar as those of other users, lead users are familiar with conditions which lie in the future for most - and so are in a position to provide accurate data on needs related to such future conditions.

"Lead users" of a novel or enhanced product, process or service are those users who display two characteristics with respect to it: (1) They face needs that will be general in a marketplace - but face them months or years before the bulk of the marketplace encounters them; (2) they expect to benefit significantly by obtaining a solution to those needs (von Hippel, 1986, 1988). Each of these two component characteristics is important from the point of view of obtaining rich market research information on new product and service opportunities. The first is important because, as studies of problem-solving have shown, users who have real-world experience with a need can provide the most accurate data regarding it. And when needs are evolving rapidly, as is the case in many high technology product categories, only users at the front of the trend will have experience with

"tomorrow's needs today." The second lead user characteristic is important because, as has been shown by studies of industrial product and process innovations (Mansfield 1968, Riggs and von Hippel 1994), those who expect a high benefit from a solution to a need tend to experiment with solutions on their own - and so can provide the richest need and solution data to inquiring market researchers.

Note that a lead user is not an "early adopter" or an "innovator" as that term is used in studies of diffusion. A lead user is ahead of all the categories of adopter listed on a traditional innovation diffusion curve such as that developed by Rogers and Shoemaker (1971). Lead users of a new product or service exist before any firm has developed a commercial product or service that is responsive to their leading-edge needs.

Product and service concept development methods that incorporate inputs from lead users are currently being adopted by a number of companies. However, innovative practitioners do not often publish the details of their procedures and field experiences. Accordingly, the authors thought that readers interested in lead user concept development methods might find a report of some recent "lessons from the learning curve" of field practice to be useful. In this article, therefore, we begin by describing a recent application of the lead user method to a concept development project in consumer services - specifically, electronic home banking. Then, a few lessons from experience are outlined and discussed. The reader will find the electronic home banking services study we review to be "rough and ready" with respect to some methodological detail. However, speed and economy in concept development is of great value to firms, and so information regarding efforts that provide "80% of the value for 20% of the effort" can have an important value for industrial practice.

2. The Lead User Case Study

Case Study Background

The lead user concept development project we will describe focused on the rapidly-evolving area of electronic home banking services. Electronic home banking services allow consumers to do some or all of their banking from home by electronic means. Thus, services which make it possible for consumers to get information regarding their bank account(s) via telephone, or that make it possible

to pay bills from home via telephone would fall under the heading of electronic home banking.

Traditionally, users have been able to call up an employee at their bank, properly identify themselves, and ask for certain information such as their checking account balance, and the dates and amounts of recent transactions. More recently, with the computerization of banks, more complex services have been made available to the home user, such as the ability to transfer money between accounts by telephone. Also, consumer access to such banking services has been automated to some extent via the growing introduction of interactive voice response (IVR) systems. In the future, it is expected that users will be able to do essentially all of their banking from home, perhaps with the aid of personal home computers linked to telephone lines, and/or by means of more capable home telephones.

The firm carrying out this study, "Firm T," is a major supplier of telephone equipment both to telephone companies and to business and home users as well. Electronic home banking was of interest to Firm T for two reasons: First, provision of electronic home banking and other such services requires the digital telephony capabilities provided by the sophisticated switching equipment developed and manufactured by the company. Second, delivery of home banking services is beginning to involve the use of more sophisticated home telephone sets - a type of product that the company is interested in manufacturing.

Case Study Execution

The general methodology developed for lead user concept development studies involves four major steps. These have been described in detail elsewhere (von Hippel 1986, 1988; Urban and von Hippel 1988). In brief outline, they are as follows: (1) Specify the characteristics a lead user will have in the product/market segment of interest; (2) Identify a sample of lead users who fit these criteria; (3) Identify and develop advanced product or service concepts jointly with lead users; (4) Test the lead user concepts developed to determine whether they are attractive to more typical users in the target market. In the paragraphs that follow we will describe how each of the four steps were carried out in this case study.

Step 1: Identify a Trend

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 that are advanced with respect to an important trend or trends in the marketplace; (2) They have high expectations of benefit from obtaining a solution to those needs.

In order to specify the first lead user attribute in the context of home banking services, it was necessary to understand the major trends affecting this marketplace. The lead user project team executed this task by first studying and discussing a number of recent articles in banking trade journals on trends in electronic home banking. Then, they selected five leading experts on electronic home banking services who had authored or were mentioned in these articles, and whose expertise seemed especially relevant to the team. Three were employees of major banks, one was an employee of a leading supplier of third party services for home banking, and one was an expert employed by an industry trade association. Each expert was contacted by telephone and interviewed to learn their views regarding major trends in the field.

The underlying general trend discussed in the trade press and confirmed by the experts was that users will be able to do progressively more and eventually all of their banking from home over their ordinary home telephone lines. The factors felt to be driving the trend were: (1) the rapid increase in the capability of the digital telecommunications network; (2) increased customer comfort with and access to electronic devices and computers; and (3) the steady increase in the computing capability of banks. The experts interviewed found this trend quite obvious - "Of course electronic home banking is coming." The lead user study team took this viewpoint as a reassuring indicator that the trend was indeed real and important.

Expectations of high innovation-related benefit from advances in electronic home banking services is the second lead user attribute in the marketplace that was being studied by the lead user team. Such expectations can be identified directly (Urban and von Hippel, 1988), and/or one can search for actual user innovations that are driven by those expectations (Herstatt and von Hippel, 1992). In this study, the study team decided to use the latter approach because it focused directly on the activity of interest to the study - problem-solving by lead users.

Step 2: Identify (and Recruit) Lead Users

The Firm T lead user study team had now determined that the lead users they were seeking to recruit for their study would have the following two attributes: (1) they would use relatively advanced electronic home banking systems now ("ahead of the trend"); (2) they would have done some level of development or tinkering with respect to these (driven by expectations of high benefit).

At this point in the study, the team made the decision to draw its sample of lead users from employees of the firm itself. This obviously restricted the search arena severely, making it unlikely that the "best" lead users would be included in the lead user sample. (We will return to this point in the discussion section of the paper.) It also clearly biased the characteristics of the lead user sample identified relative to the general population of lead users - for example, Firm T's employee population contained a very large proportion of engineers. However, the team felt that there were advantages that outweighed these potential problems. Notably, the population to be searched was very conveniently accessible, and it would be easy to maintain confidentiality with respect to study results.

The team implemented its lead user recruitment strategy by using Firm T's internal electronic mail system to send out an inquiry to approximately 1300 people. The message sent asked people to respond if they had "...found novel ways to take care of their personal banking service needs. For example,...written or adapted a home software program to automate a manual procedure, found a novel way to use a service offered by the bank to achieve a purpose other than was originally intended, or devised a novel procedure for paying bills or keeping records." Within 24 hours, 15 people did respond with return messages that included a brief description of their novel home banking routines.

These 15 potential lead users were then contacted by the project team, and 11 were found to be available for individual interviewing by team members at mutually convenient times. Interviews were then carried out, each consisting of a face-to-face discussion of 30-45 minutes duration during which the interviewee was screened with respect to two matters. First, the interviewer probed to determine whether the interviewee's home banking activities included novel solution content actually tried out in practice. (User insights into needs and potential solutions are much richer when they are drawn from actual field problem-solving and experimentation.) Eight of the 11 interviewees were judged to have passed this screening criterion, although the novelty involved in the practices discussed was typically relatively minor. Thus, one of the users had adapted an Excel spreadsheet to keep three separate bank account balances: the check register

balance, the cash balance reflecting only cleared checks and transactions, and a third balance used to test payment scenarios, e.g., "If I delay paying that bill to the end of the month, and my paycheck is deposited on time, can I afford to go to skiing this weekend?" Another used a combination of a commercial PC-based bill paying service and a self-customized financial planning software package for keeping track of a complicated family financial situation involving salary incomes from two employers for himself and his wife, as well as income and expenses for a business operated from their home.

The second screening criterion for further involvement in the lead user study involved two simple matters that would affect how well the respondent would be able to work with the project team: Could the user describe his or her experiences and ideas clearly? Did the user seem to have a strong personal interest in the development of improved home banking systems? Seven of the 8 individuals who passed the first screen also met these additional criteria, and were asked to join with expert Firm T personnel as lead user participants in a "concept generation workshop." Six were able to attend.

Step 3: Service Concept Development at a "Lead User Workshop"

The lead user project team had decided to obtain lead user inputs to the concept generation process via a "workshop" meeting. Workshop participants included the 6 lead users recruited as described above, plus three Firm T project team members plus a meeting facilitator who was expert in lead user concept development methods. The project team members consisted of a development engineer, a marketing research specialist, and an engineer responsible for market development activities in electronic home banking. The workshop was scheduled to have a duration of between 4 and 8 hours, depending on progress made and on the enthusiasm and stamina of workshop members. In the event, it lasted for six hours. Company project team members present were full participants, and not just observers. This allowed them to raise questions and note problems regarding lead user concepts being discussed. Such matters could then be immediately subject to joint problem-solving by all workshop participants.

The first steps in the workshop consisted of various "getting organized" activities. The facilitator briefly explained the rationale for a lead user workshop. Next, the topic of the workshop was reviewed. Then, each of the lead users present introduced him or herself and briefly described his or her home banking system, and the functions they were attempting to achieve by devising and using their

systems. Next, in order to provide some structure for the discussion, the facilitator suggested that the group discuss each of four relatively independent home banking activity segments in turn: bill-paying, home budgeting, tax planning and investment planning. The group agreed with this segmentation but, in the ensuing discussion, it turned out that only 2 of the 6 lead users present had personal experience with tax and/or investment planning. As a result, the group decided to restrict the workshop discussions to the bill paying and home budgeting functions of electronic home banking systems. (These are the most commonly-employed elements of such systems. If the study team wished to do so, it could later assemble other groups of lead users to focus on the tax and investment planning aspects of home banking.)

Next, each lead user in the group again reviewed his or her own home banking systems, this time in terms of the underlying sequence of basic activities involved. This review showed clearly that each lead user system had basic activity sequences in common, but differed in terms of the features used within each general activity. The group then constructed a chart to summarize this discussion. The basic activities that had been identified were used as headings, and feature options that this particular lead user group had found to be desirable were listed under each heading (Table 1).

Table 1: Workshop chart summarizing activities performed by lead user electronic home banking systems for bill-paying and budget tracking

<u>Process stage</u>	<u>Outside Information</u>	<u>User Information</u>	<u>Calculated Output</u>
1. Set Up System		Budget categories Default settings	
2. Request for payment from payee	Via electronic or paper mail: - payee ID & acct # - amount due- due date - purchases by line item	- enter category of payment at line item level - include self-payee categories (e.g. savings)	Create internal accounts with separate balances, etc.
3. Review of payment request by home user		Specify when to pay - partial payment option - automatic payment with confirmation - automatic payment with range test - stop/modify payment option	Display account balance over time if payments programmed to be made are in fact made.
4. Transfer of funds to payee			Notify bank, payee intermediary, or self to execute transfer
5. Post-Payment Review by home user	-Bank reports payment sent -Payee reports receipt and how payment applied - Bank reports user checks and ATM withdrawals		Display in budget format
6. Reconciliation of account			Expected compared with actual - new info and exceptions flagged

Finally, the facilitator focused workshop participants on developing a concept statement for an electronic home banking system that incorporated the features that the lead users had found valuable in their own home banking experiences. (The lead users at the workshop were currently implementing these features on their home personal computer systems. But Firm T workshop participants judged that the same functions could be delivered by banks to less advanced users via a home telephone containing a liquid-crystal display.)

The concept statement developed by the workshop showed significant novelty relative to current banking practices in the US. It proposed that consumers enter their planned payments into bank computers immediately, and have banks pay these out at user-defined times and in user-defined ways. Banks would then keep "checkstub" records for users, would automatically add records for non-check transactions like ATM transactions, and would reconcile user accounts automatically. The user would have instant feedback as to the checking account balance that would result if planned deposits and payments occur as scheduled - no more overdrafts as a result of faulty bookkeeping. Also, if desired, the user would have instant information as to the impact of planned expenses on the planned budget for the household.

Step 4: Testing Whether Lead User Concepts Appeal to Typical Users

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. In the instance of this study, the team elected to accomplish this by contrasting the general home banking system concept developed by lead users with service concepts tested and found popular in a study of electronic home banking previously conducted by Firm T in cooperation with a leading northeastern bank. The goal of that earlier study was identical to the goal of the lead user concept development study: to identify a set of home banking services that would be strongly desired by many banking customers.

The earlier study began by generating a list of potential services via "brainstorming." Most of the envisioned services were already being offered by some banks to their home banking customers. The marketplace potential of each service concept had then been tested by surveys and interviews directed to a sample of two hundred respondents who were selected to be "electronically literate" - users of home computers, VCR machines, and/or advanced telephone services. The users polled identified four of the proposed service features as the

most attractive ones, with between 81% and 89% of the respondents expressing an interest in subscribing to them for a fee. The two services found to be most popular with respondents were: Provision of current account balance; and provision of a report on the last five transactions in the account. Both of these services were being offered by many banks to their customers via a variety of telephone-based inquiry systems.

The lead user project team set up its comparison test by describing the four features found most popular in the earlier study of electronic home banking on a single sheet of paper under the heading "System A". The concept statement proposed by the lead user workshop participants was also described on a single sheet of paper under the heading "System B". The team then sought out samples of "electronically literate" users who would be comparable to the respondents in the first study, and asked them to assess the relative attractiveness of these two systems.

Three samples of users were ultimately found to be conveniently accessible: (1) 13 professional technical employees of Firm T who had no advance knowledge of the lead user study; (2) 19 middle and upper-level engineering managers drawn from a range of firms who were attending a two-week course at a local university on the management of technology; (3) 38 mid-career technical managers drawn from a range of firms who were participants in a full time, one-year intensive Masters degree program in technical management. Each of these groups of respondents were asked to read the descriptions of System A and System B and invited to ask any clarifying questions they liked. They were then asked to rate the relative attractiveness of System A and System B on a 7 point scale.

Table 2: Ratings of the attractiveness of the services embodied in System A and System B - three samples combined (7 point Likert scale with 1 = not at all attractive and 7 = highly attractive)

	System A Attractive- ness ratings	System B (Lead User) Attractive- ness ratings	Respond- ents rating System A higher (%)	Respond- ents rating the systems as equal (%)	Respond- ents rating System B higher (%)
Mean (n=70)	4.46	5.33	14%	17%	69%
Std. deviation	1.43	1.51			

The combined data for all three samples of respondents are shown in Table 2. Respondents found the lead user designed service concept to be significantly more attractive than System A ($p > 0.001$). The number of respondents favoring the lead user system was nearly 5 times greater than those favoring the alternative concept.

The respondent samples used by the lead user team were probably on average more "electronically literate" than those sampled in the earlier study described above. However, the team did not regard this as a matter for serious concern, and felt that the appeal of the lead user concept would not be highly dependent upon the technical sophistication of the user. This view was based on three considerations. First, the earlier Firm T study had found that user preferences did not vary much as a function of the demographics of individual respondents. Second, the relative user preferences expressed for Systems A and B were found to be very similar for the three groups of respondents tested by the lead user team (table 3).

Table 3: Respondents' ratings of the relative attractiveness of Systems A and B - Comparison of the three subsample responses

GROUP	System A Preferred	System B (Lead User) Preferred	No Preference
Company ^a (n=13)	15.4%	69.2%	15.4%
MOT ^b (n=38)	18.4%	68.4%	13.2%
SC ^c (n=19)	5.3%	68.4%	26.3%
Aggregate sample (n=70)	14.3%	68.6%	17.1%

^a Sample of 13 engineers from the sponsoring company who responded to electronic mail solicitation.

^b Sample of 38 participants in a mid-career Management of Technology Masters degree program.

^c Sample of 19 executives from a two-week intensive short course in Management of Technology

Third, the team analyzed user preferences for System A vs. System B as a function of the degree of familiarity of the user with existing automated banking services, as indicated by usage of Automated Teller Machines (ATM's) and the Interactive Voice Response systems (IVR systems) installed by many banks to respond to telephone inquiries made by their retail customers. No significant differences were found in preferences along this experience dimension (table 4).

Table 4: Respondent preferences for Systems A and B as a function of respondent's experience with existing automated and home banking system elements.

GROUP*	System A Preferred	System B (Lead User) Preferred	No Preference
Total Sample (n=70)	14.3%	68.6%	17.1%
ATM users (n=64)	15.6%	68.8%	15.6%
ATM + IVR for account balance users (n=38)	13.2%	65.8%	21.0%
ATM + IVR for account balance and transaction review users (n=29)	13.8%	65.5%	20.7%

*Note: Each succeeding group is a subset of the preceding one.

3. Discussion

Firm T managers judged the electronic home banking lead user study described here to be a significant success. They felt that it had generated significantly different and significantly better information and better service concepts than did the more conventional marketing research study that had been conducted earlier. In addition, they felt that the lead user method, beginning with identification of technological trends in electronic home banking and ending with a novel service concept containing several features, was significantly faster and cheaper than the more conventional marketing research methods they normally

used. This is consistent with other field experience, which tends to find that concept development via lead user studies tends to be twice as fast and half as costly as more conventional concept development methods (e.g., see Herstatt and von Hippel 1992).

We next turn to brief discussions of four "lessons from the learning curve" that we think will be useful to those using or considering using lead user concept development methods. These are: (1) the value of identifying lead users via a networking process rather than by surveys of likely user populations; (2) an "innovation first" approach to lead user identification; (3) the value of understanding "lead user systems" when developing new product and service concepts; (4) learning from vs. adopting lead user innovations.

Identifying "The Best" Lead Users: Networking vs. Screening Surveys

As was noted earlier, lead users (1) face needs that will be general in a marketplace - but face them months or years before the bulk of the marketplace encounters them; (2) expect to benefit significantly by obtaining a solution to those needs (von Hippel, 1986, 1988). The first criterion focuses our attention on users are facing "tomorrow's general marketplace needs today." The second criterion focuses us further onto that subset of users facing advanced needs who also have a significant incentive to problem-solve with respect to them. It is useful to note, however, that all lead users are not created equal: they can vary with respect to their abilities and their inclinations to problem-solve, and also with respect to the quality of the solutions that they happen to develop. Indeed, lead users with "the very best" information may be very thinly scattered among the population of all lead users.

Given these conditions, lead user project teams may wish to seek out those lead users with the very best information via a networking process rather than via some form of screening questionnaire. The networking process we have used and have seen others use in the field essentially involves calling experts in the product or service topic area (identified, for example, by articles they have written on the topic), and asking these experts whether they know of any especially innovative lead users and/or whether they know of any especially interesting innovations that have been developed by users in the field of interest. One can also ask these experts to identify fellow experts on the topic, and contact those individuals in turn. Such a procedure will quickly identify a set of experts and especially innovative lead users who are potential contributors to the lead user study. (Mary

Sonnack of 3M Corporation and Joan Churchill of Performance Psychology have developed excellent methods and training materials for implementing the networking approach to lead user identification.)

The advantage of this method over a screener-based method is obvious. Via a networking approach, one can search a very large population quite economically for the lead users with outstanding information - even if these users are members of very large populations and/or located in unlikely places. Use of a screening questionnaire on a selected population, on the other hand, obviously restricts one to the population directly sampled - and the number of users actually contacted in that population may be quite small due to cost considerations. (Thus, in the study reported on here only 1,300 users in one company were contacted via e-mail to identify a lead user sample. Similarly, in a lead user study of PC-CAD, only 178 users were screened to identify a sample of lead users (Urban and von Hippel 1988). And in a study of pipehangers, only 74 user firms were screened (Herstatt and von Hippel 1992).)

An "Innovation First" Approach to Lead User Identification

The first of the four general steps proposed for conducting a lead user study involves identifying important trends in the product/market segment under study (von Hippel, 1986). In some fields and studies, this works well. But field experience has shown that sometimes data on trends are simply not very good in a particular product/market segment and/or those with expertise in an industry simply cannot reach consensus regarding important trends. Under these conditions, efforts to focus on one or a few important trends at the start of a lead user study can simply lead to frustration and/or to the selection of a trend that is so general (for example, "the user wants increased convenience") that it does not contribute much to focusing the search for lead users that will be undertaken next.

In such cases, there is an alternate first step that can be very useful. Begin a lead user study by searching for users that display the second of the two lead user characteristics listed in the definition of lead users: users that are positioned to benefit significantly from the solution to (leading edge) needs facing them. As was noted earlier, those who expect to benefit significantly from a solution to a need will tend to invest in solving it. Therefore a team can search for innovations by users as a proxy for the second characteristic. Once it has found such innovations in a product/market area under study, the team can study them to learn more about

important trends in that marketplace, and then can proceed to identify lead users with respect to such trends.

Consider the following example. A lead user concept development team seeking lead users of telecommunications services found it difficult to reach consensus on important trends affecting their target market. They therefore switched their efforts to the alternative first study step just mentioned, and began scanning two years of back issues of several trade journals that covered industries with a reputation for advanced uses of telecommunication services and equipment. The purpose of the scan was to flag all descriptions of user innovations found that appeared to be or to incorporate novel telecommunication services. This scan yielded a number of interesting user innovations of the desired type. The team then assessed these innovations and found that a number of them appeared to address an important trend that had not been previously identified - a growing need for dial-up wideband wireless telecommunication services to and from locations not planned in advance. Having identified that trend, the team was then in a position to identify a sample of lead users with respect to it, and carry the study to a successful conclusion (Bailetti, 1991).

The Value of Understanding Lead User Systems

Market researchers understand that individual products, process equipment, and services are components in larger systems. This is clearly visible in the instance of processing machines (which fit into larger processing systems) and in the instance of industrial components (which perform functions within larger products or services). It is also true, but perhaps less intuitively obvious, in the instance of consumer goods and services. For example, a fork is a component part of a user's system for eating, and a component as well of systems for conveying signals on social status and other matters. Similarly, a telephone-answering service or machine is a component of many consumers' complex personal systems for receiving and storing data. As an important consequence, end users and system designers value products and services only because of and in terms of their role in the system as a whole (Boyd and Levy 1963). That is, the "need" for a function(s) that such a product or service provides is a *derived* one. For example, computer designers and operators may have an intensely felt need for magnetic hard disks. But this need is derived from the role these data storage components play in a computer system: they would have no need for computer disk drives absent computers.

Lead users who innovate are often very aware of the overall systems they use to, for example, conduct electronic home banking. Discussions of these larger systems during lead user workshops can allow manufacturers to understand the contingent nature of demand for the product or service concepts they are developing. For example, in the lead user case described in this paper, the system-level discussions conducted shed an interesting light on the two home banking services that had been identified by Firm T's early marketing research study as most desired by consumers. Lead user practices at the system level showed that both the "get the current balance for your account" service and the "get a report on the last five transactions in your account" service could be viewed as relatively clumsy work-arounds that users would probably abandon given a fundamentally better system. That is, in the view of the lead users at the workshop, banking customers only wanted these two services in order to try to reconstruct account records they suspected to be incomplete or faulty. (E.g., they wanted to determine whether they were about to bounce any checks.) Such "reconstruction aids" would be unnecessary if account record keeping was automatically and continuously done as it was in the lead user home banking systems.

Learning From vs. Adopting Lead User Innovations

Lead user innovations provide valuable data to inquiring manufacturers because they have been developed under real world conditions, and have been found by lead users to provide real value. Sometimes, manufacturers will find it appropriate to commercialize innovations that are very similar to the innovations developed by lead users (as in the cases reported on in von Hippel 1988, Chaps 1 & 2). However, sometimes they will find it more appropriate to adapt lead user innovations and practices to achieve a better fit to their intended market.

The study we have described here illustrates this latter approach. The electronic home banking systems developed by lead users and studied by the Firm T lead user project team were based on personal computers located in the homes of the lead users. The project team, however, was aware that many of the users in their intended marketplace did not own personal computers and were not likely to buy them soon. Accordingly, they decided it would be appropriate to port the home banking functions implemented in the lead user systems and tested in the lead user concept description to a different hardware platform - home telephones with liquid crystal displays driven by computers located at suppliers of banking services.

Lead user concept development methods are continuing to evolve rapidly, and we very much hope that both researchers and practitioners will find this "report from the field" to be a useful contribution to their work.

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