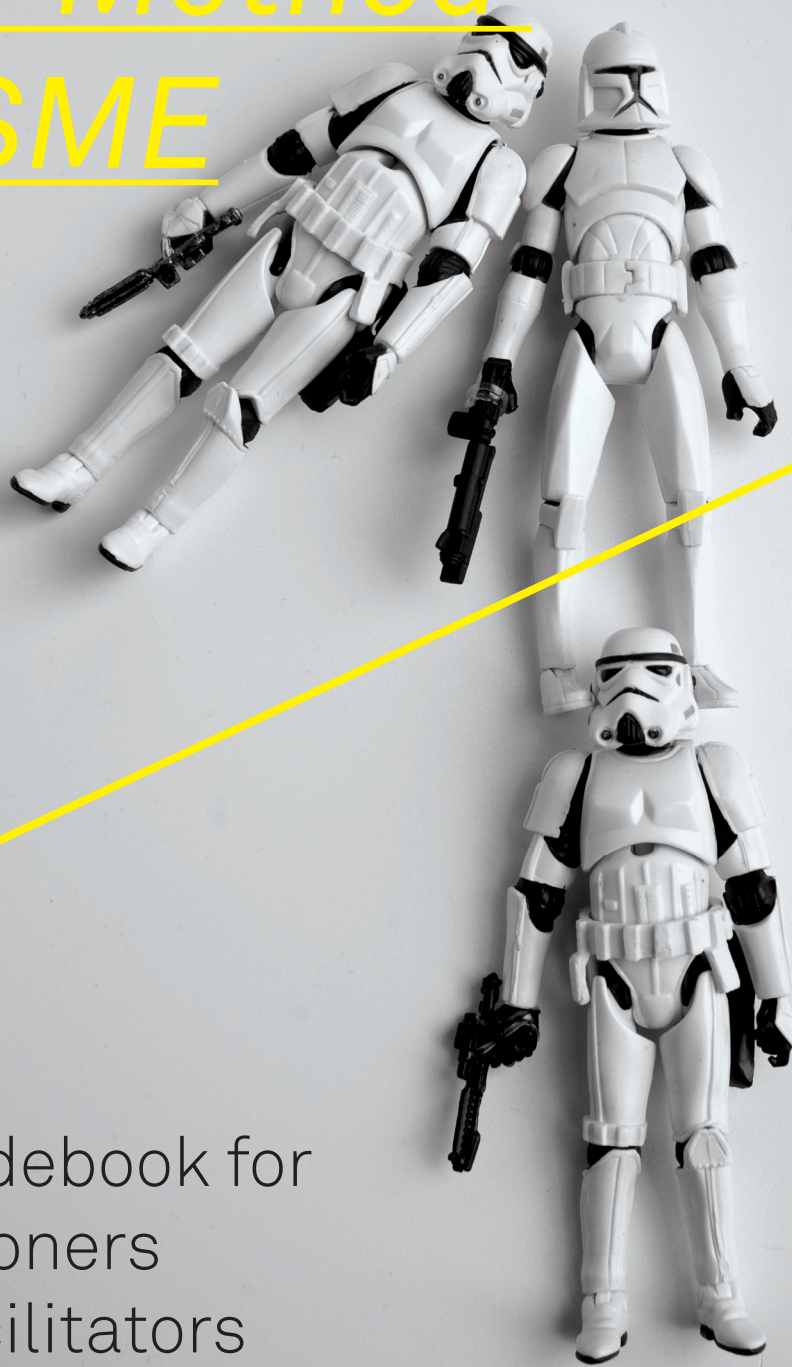*Ebel/Bretschneider/Leimeister*

The Lead User Method for SME

> a Guidebook for
Practitioners
and Facilitators

Ebel/Bretschneider/Leimeister

The Lead User Method for SME

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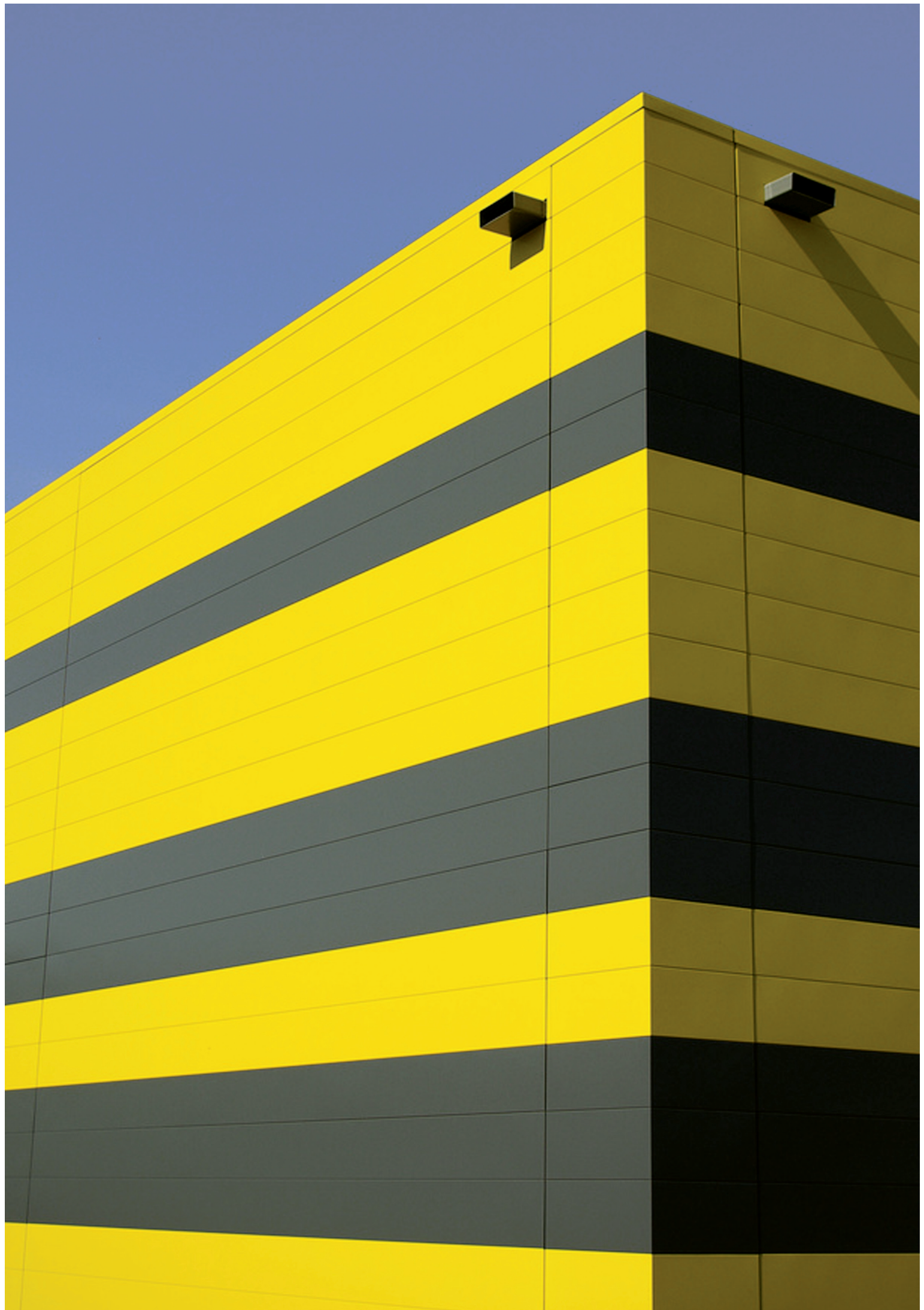
FOREWORD

This handbook was developed in the course of "The Open Innovation Project" (http://openinnovationproject.co.uk), which is funded by the INTERREG IV b. Project number: 166F-IOIT.

We wrote this handbook in order to support SMEs in applying the lead user concept, which was originally developed by von Hippel (von Hippel 1986). The ability to carry out a lead user workshop can make a significant contribution to raising the innovation capacity of SME's. Several studies in different markets have found that a large amount of users which already generated innovations are lead users, and that prototypes that have been developed by lead users often form the basis for innovative and commercially successful products. Nevertheless, the realisation of the lead user concept (including the preparation of the project, the identification of suitable participants and relevant market trends as well as the execution of the workshop) requires extensive process and methodical competencies (Churchill, Sonnack, & Von Hippel, 2009), and is, therefore, hard to achieve for SME's. Without knowing how a distinct activity (e.g. a brainstorming on possible solutions to the problem at hand, or the reduction of different alternatives) should be executed, the only way to conduct a lead user workshop is to hire an external specialist who is familiar with the lead user concept, and who knows how to execute the according activities correctly. At present, the application of the lead user concept (including the identification of relevant trends as well as lead users) takes approximately 9 months, and costs about $51,000 (Herstatt et. al. 1991).

In the following chapters we will address two major issues:

> *How to lower the required methodical skills by providing concrete guidelines on how to conduct a lead user workshop*

> *How to lower the costs of applying the lead user concept by adjusting the procedure of conducting a lead user study appropriate for the needs and capabilities of SMEs*

In order to do so, we will present every step that is necessary for conducting a lead user study, while providing detailed information about how to execute these particular steps. In addition, you will find several research notes within which we describe our efforts to adjust the lead user concept to the abilities of SMEs. For the purpose of illustrating the steps of a lead user study, we also included a running case, describing a lead user study that was executed with Spacenet, a medium-sized German software provider. Within this study, Spacenet successfully applied this handbook to develop a future cloud computing service.

We would like to thank Joan Churchill, Eric von Hippel and Mary Sonnack for their research concerning the application of a lead user study. Their work was an important foundation for this publication.

Philipp Ebel, Dr. Ulrich Bretschneider, Prof. Dr. Jan Marco Leimeister

CONTENT

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INTRODUCTION

In recent years, companies in developed countries experienced fundamental changes in their economic environment. These changes include the increasing mobility of skilled labour, a greater dissemination of knowledge and an increased competition among the several companies in their relevant markets (Chesbrough, 2003). As a consequence, many companies face an increasing pressure to shift their innovation efforts, and to turn their attention towards external knowledge sources (Chesbrough & Vanhaverbeke, 2011; Zogaj & Bretschneider 2012). This shift was coined Open Innovation by Henry Chesbrough (Chesbrough, 2003).

Basically, companies often react to that pressure by improving their products step by step, and, thus, to keep or develop their market position. In order to do so, a variety of methods and concepts are available to investigate current markets. These traditional methods are usually characterized by the fact that in the course of their implementation a representative range of customers is examined regarding their current and future needs. The goal of these methods is to develop a product range that meets the needs of a broad range of customers, and, consequently, to maximize the market of the enterprise. However, these achievements are usually limited to the gradual improvement of the existing product range. If innovations in terms of a subjectively new idea are intended, conventional market study methods often reach their limits. Therefore, the rate of failures of novel products in industrial goods markets is between 25 and 40 percent, and in the area of consumer goods markets even between 35% and 60% (Lüthje 2007). In literature, the functional fixedness, which describes the fixation of customers to the functions and capabilities of existing products, is seen as a major reason for this (Herstatt, Lüthje et al. 2007; Lüthje 2007). This adjustment on the present product range is one cause why the average customers have only a very vague conception of their future needs. Moreover, it is often not possible for them to articulate them. Access to new application possibilities and products is blocked, and the generation of innovative products is made more difficult (von Hippel 1986).

Enterprises, however, are dependent on realizing both incremental improvements to their existing product range as well as radical innovations to ensure their own survival. One method which aims to overcome the functional fixedness of traditional customers is the lead user approach. In the lead user approach innovative customers are included in a product development workshop together with company representatives (von Hippel 1986).

Empirical research on user driven innovation shows that user-developed products are often developed by so called lead users (Von Hippel, 2005). These lead users are very likely to come up with innovations, because they are ahead of important market trends. More precisely, they recognize future needs month or years before the rest of the market. Furthermore, they anticipate high benefits from an adequate solution, and are, therefore, expected to participate in the innovation process (Von Hippel, 1986). Several studies in different markets have found that a large amount of users which already generated innovations are lead users. Prototypes that have been developed by lead users often form the basis for innovative and commercially successful products. Urban and von Hippel confirmed the potential of the lead user method already shortly after its publication (Urban and von Hippel 1988). They were able to show that products that were developed by lead users exhibited a substantially higher customer acceptance in comparison to other product concepts. These results furthered the interest of researchers, whose later studies proved that IT-systems developed by lead users are regarded products that promise a high potential for their commercial use (Morrison, Roberts et al. 2000). For example, an astounding 48 percent of the surgical product innovations driven by lead users had commercial potential. Additionally, an exploration of the innovation activities of 3M showed that product concepts, which were developed with the help of the lead user method, supply substantially better economic results compared with conventionally developed concepts (Lilien, Morrison et al. 2002).

The lead user approach is typically divided into four major phases (von Hippel 1986; Urban and von Hippel 1988). Firstly, the preparation for the lead user project has to be completed. In the subsequent step, important market trends in the company's environment have to be identified, and measures to evaluate the success of the lead user project have to be developed.
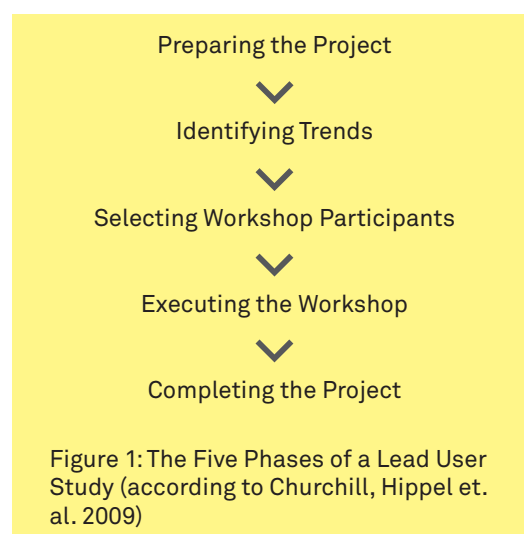
Within this step, company representatives also have to select lead users, who are capable of developing product concepts related to the identified trends.

The execution of the lead user workshops represents the third step within a typical lead user study. In these workshops, the identified lead users develop new product concepts related to the previously identified trends. Finally, the results of the workshops are evaluated according to the developed success measures, and documented within a business plan. In the ensuing chapters, we will elaborate every step, and explain what SMEs must do within each step in order to successfully produce innovative prototypes. The steps are depicted in Figure 1.

Preparing the Project

v

Identifying Trends

v

Selecting Workshop Participants

v

Executing the Workshop

v

Completing the Project

Figure 1: The Five Phases of a Lead User Study (according to Churchill, Hippel et. al. 2009)

Hilti is a leading European manufacturer of components, equipment and materials used in the construction industry. The focus of the Hilti lead user study was on the development of a concept for a novel "pipe-hanger" system. In collaboration with lead users, Hilti personnel developed a concept for a very novel pipe-hanger system that has been extremely successful commercially, and won them an industry achievement award for their product concept development work. The Hilti lead user study was designed and coordinated by Dr. Cornelius Herstatt.

Under Herstatt's direction, the Hilti project team began its lead user study by identifying a few important need-related trends. This was done by conducting telephone interviews with experts in the field of study.

Based on the trend analysis, the team chose to focus the study on three important market trends and related, emerging market needs:

1. *Pipe hangers that are very easy to assemble (Reason - education levels among installers were decreasing.)*

2. *A more secure system of connecting hanger elements and attaching them to walls and ceilings (Reason - safety requirements affecting pipe-hangers were becoming more stringent over time.)*

3. *Lighter, more corrosion-resistant pipe-hangers (Reasons - first, existing and heavy pipe-hangers were difficult for workers to install safely; second, many more pipe-hangers were being installed in corrosive environments, such as chemical plants.)*

Next, the Hilti team identified twenty-two expert users by surveying cooperating firms throughout Europe. The users were all tradesmen who had actually built, and then installed hangers, incorporating modifications of their own design when they felt that commercially available hangers were not suitable for the job they were working on. The list was pared down to twelve lead users, who had the most excellent information to offer. The twelve lead users joined Dr. Herstatt, the Hilti engineers and a marketing manager for a 3-day concept development workshop. Participants jointly developed specifications for a new type of pipe-hanging system that included several products, and incorporated features identified in the trend analyses.

The final step in the Hilti lead user study was to ask a small sample of "routine" users to evaluate the concept that stemmed from the workshop. The majority of those surveyed preferred the new concept, and indicated that they would be willing to pay a 20% higher price for it. Based on lead user concepts, Hilti developed a line of products that have been very successful commercially. As illustrated in the case study above, the ability to carry out a lead user workshop can make a significant contribution to raising the innovation capacity of SME's.

1

STEP ONE: *PREPARATION OF THE LEAD USER PROJECT*

For small- and medium-sized companies, the preparation of a lead user project can be simple, and completed quickly. This is due to the fact that the project planning team can manage all phases of the project. The project planning team is responsible for the operative aspects of setting up the lead user project, and should include personnel with sufficient marketing as well as technical knowledge. The main task of this team is to develop the project master plan, which then has to be approved by the management team. In addition, the project planning team has to select the lead user research team, and introduce them to the project. In the following sections we will go through each of the mentioned steps.

1/1 Developing the Project Plan

First of all, the planning team has to develop the project plan. This plan will determine the focus of the lead user study. In this first activity, the team has to specify the following three areas:

1. *Product and/or service areas of interest*
   - the general types of markets, products or services and applications that will be the focus of the innovation effort

2. *Overall project objectives*
   - the key deliverables of the lead user study and the near-term and/or long-term business goals of the project

3. *Resource requirements*
   - the people, time and money required to implement the lead user study

1/1/1 New Products/Service Areas of Interest

In order to define the new products and services of interest, management has to decide on the characteristics of the desired product in terms of three dimensions. These three dimensions include the product category (general types of products that have to be developed), the target markets (the customer group that is of interest), as well as the applications (functions or needs that have to be addressed by the developed product).

In defining the focus of the project, the team has to decide which markets, product or service areas and applications are most interesting to the company. In order to do so, a preliminary market investigation should be executed to require a sense of which area represents the best commercial opportunities. The market assessment in this phase usually involves quick and informal activities - for example, bringing together key company people for idea generation sessions, and reviewing internal market data. In doing so, the project planning team typically ends up with a written description of the product/service areas of interest. Below you can find an example that was developed in a lead user study that was conducted for a cloud computing service.

Nr. 8

RUNNING CASE

New Product Areas – Future Cloud Computing Service

<u>Product Category</u>	We seek to develop a concept or several different concepts for a new cloud computing service which is highly innovative and trustworthy.
<u>Target Markets</u>	› *End Users: individuals without experience in using cloud computing (CC) services* › *B2B-market: companies that are refraining from using CC Services due to the fear of data loss*
<u>Applications of Interest</u>	We envision a new CC service that is highly innovative, and, at the same time, capable of reducing our customers fear of data loss. Based on our market analyses, we predict that potential services will address these key user needs: › *Transparency of data usage* › *High data security* › *Improved usability*

1/1/2 Overall Project Objectives

After the product and service areas of interest have been determined, the project planning team has to define the overall project objectives. When determining the overall project objectives, the project planning team should define the specific "deliverables" of the lead user project as well as the key business interests. In doing so, the team has to make sure that the project goals match those of the company. The table shown below illustrates how the business goals were defined by the management team of the cloud computing project.

RUNNING CASE

Business Goals – Future Cloud Computing Service

Desired Project Outcomes	> Identification of market / need areas that represent strong business opportunities in the long run > Generation of at least one novel concept for a cloud computing service that is capable of enhancing users' trust of cloud computing
Key Business Goals and Constraints	> The new service should increase our market share within market of B2B cloud computing service by about 5% in the next 2 years. > The new service should utilize current company technologies > The new service should enable continued reliance on current distributors

1/1/3 Resource Requirements

Considering the required resources for conducting a lead user study, the project planning team has to decide how much time the research team is granted to work on the study. Conducting a lead user study is by no means a trivial endeavour. Therefore, the core research team members should devote at least one third of their time to only the study. The table below depicts the amount of time required for the cloud computing study.

Step/Major Activities	Assigned Personnel	Time Required
Step 1 - Project Planning ❯ *Develop a master plan* ❯ *Learn about the current marketplace* ❯ *Further refine the project focus*	project planners project team	2-3 weeks - total time
Step 2 - Trend/Needs Identification ❯ *Conduct literature searches* ❯ *Interview top experts* ❯ *Interpret/analyse data, select specific needs to focus on*	individual members whole project team	2-3 weeks - total time
Step 3 - Preliminary Concept Generation ❯ *Interview lead users and experts* ❯ *Gather data for business "case"* ❯ *Define new product or service requirements, generate concepts*	individual members whole project team	2-3 weeks - total time
Step 4 - Final Concept Development ❯ *Invite participants* ❯ *Hold workshop - improve concepts with lead users/experts* ❯ *Finalize concepts*	individual members whole project team	1 week - total time
Project Wrap-Up ❯ *Evaluate project outcomes* ❯ *Plan next commercialization steps*	management/project team (others involved in next steps)	2-3 days

After the project planning team has elaborated the required time for conducting a lead user study, they have to consolidate their results within an overall project plan. This plan should include the types of markets and applications areas that will be addressed by the future product, as well as the estimated time requirements. Thereby, the project plan will ensure that all project members will have a clear understanding of the desired outcomes.

1/2 *Selecting the Lead User Research Team*

When the master project plan is in place, the next planning task is to designate the core research team which will implement the lead user study. In this section, a few general guidelines for putting together an effective team are provided. As proposed by Churchill et. al. (2009), an ideal team comprises three to four people. This ensures that the group large enough to obtain different perspectives. At the same time, it is not so large that it is difficult to make decisions and move together as a group. If there are other people whose input could be useful at various points, they can always be brought in as "auxiliary" team members. For example, the hearing health team periodically called on the expertise of one of the technical specialists in the company, and frequently consulted internal audiologists. In our experience, the most effective research teams are those that have diverse skills, experiences and perspectives represented on the team. The richer the mix is in these areas, the higher the chances are for producing really creative ideas. It is also critical to put together a team of your best people with respect to their expertise relative for the innovation area. In terms of specific skills, the combination of abilities needed include the following:

Expertise in the problem area

> *Team members should have a knowledge base relative to the innovation area that is deep, as well as broad. The reason this is important is that lead user research requires team members to work effectively with ideas and information outside of their disciplines.*

Ability to think creatively

> *It is important to have one or two members who are creative thinkers. We have found that if someone on the team can provide leadership in this area, it gets the creative juices of the whole group flowing.*

Openness to new approaches

> *A high degree of receptivity to new ideas and multiple perspectives is required for a lead user project. Also,*

Team members must not feel that innovating is a solitary task or one that they would prefer to keep to themselves

> *A lead user study requires an open and joint process. More than anything, "openness" is an attitude and one that is important for all team members to have.*

When considering which people will make good team members, a good starting point for managers is to ask these questions:

1. *Which technical and marketing people are the most knowledgeable with respect to our innovation area?*

2. *Which people are good, creative problem solvers?*

3. *Which people are open to learning and sharing new ideas and approaches?*

When we pose these three questions to managers, they usually know which of their personnel have these qualifications, and can identify the best candidates for the lead user research team very rapidly. The example below gives an idea of the various kinds of competencies that are desirable to have on the team.

RUNNING CASE

Future Cloud Computing Service

The cloud computing project team consisted of four people with the following kinds of expertise and professional expertise:

Team Leader:	> *The project leader was a research assistant. This person had led other product development projects, and already had experience in facilitating other kinds of workshops.*
Marketing Experts:	> *The team included two experts within the field of cloud computing that had led other cloud related research projects.*
Technical Expert:	> *The project team was completed by a technical specialist who is responsible for new product development activities within the company.*

1/3 Team Preparatory Activities

After the research team has been assigned to the project, it is important to prepare the members for the upcoming tasks. This is because teams are usually faced with considerable ambiguity at the beginning of lead user projects. Although management has set a broadly framed focus, team members are likely to be starting out with important questions about the project: What a specific outcome is the team expected to deliver? Which aspects of the marketplace should be researched and where should we look to find high quality market information? Getting past this initial confusion is often a major undertaking for project teams, particularly if some or all members have not worked closely together before, and are doing a first lead user study.

The preparatory work that lead user teams do in this phase consists of two major activities:

1. *Getting grounded in the project - Team members do various kinds of "homework" activities, such as reading in trade journals and talking with important project stakeholders, to acquire a basic understanding of the current marketplace.*

2. *Planning data-collection - During this phase, the team develops a specific plan for the intensive data collection that begins in Phase Two.*

1/3/1 Getting Grounded in the Project

An important task for team members in this phase is to become acquainted with the focal topic of the project. In the beginning of lead user projects, some teams already have of good feel for the marketplace. More often, however, some or all members are exploring an innovation area that is new to them. As a result, they do not know some of the important basics of the project. For example, the current needs of concern to real world users, the industry experts that are doing leading edge work, the major trends and other factors that are driving current practices in their industry. Therefore, it is necessary for the research team to get in touch with major project stakeholders as well as leading experts within relevant product/service areas, in order to gain an adequate understanding of the marketplace.

Discussions with stakeholders will sharpen the team's knowledge of current trends and market issues that should be explored during the project. Also, stakeholders are often closely connected in the industry and may know top experts that would be useful to interview during the project. In most projects, it will be useful to interview important project stakeholders who fall within the following four categories:

Users

❭ *The people who will actually use the new product or service. For example, the users of adhesive tape are the people who actually take tape off the dispenser, and use it in their work or other activities. Obviously, users are always important stakeholders in a concept development project. After all a new product or service will only succeed in the marketplace if the users like and want it!*

Distribution Chain

> *The "chain" of people and firms, who buy, sell and transfer a product or service in a series of transactions until it finally reaches the user. For example, the desk lamp used by an employee in the workplace will typically have been bought by an office supplies purchasing group, which, in turn, has bought the lamp from a distributor, who bought it from the manufacturer. Members of the distribution chain can be importantly affected by some aspects of new products and services, and in many projects, it will be critical for a new product to be compatible with their interests.*

In-firm Stakeholders

> *The groups and individuals within your company that will have an important impact on the ultimate success of any new product or service that the team may propose. They may include the development groups that will be responsible for creating the final design.*

Other Stakeholders

> *There are sometimes other important groups of people associated with the business who can have a major influence on the commercial success of a project. Examples of such "other stakeholders" are the federal regulatory groups and the industry associations that set product and service standards in many fields.*

1/3/2 Planning Data Collection

Once team members feel they have a good basic understanding of marketplace, the next and final task in Step One is to develop a specific plan for beginning to intensively investigate the marketplace in Step Two. The following is the practical planning work that should be done:

> *Agree on the high-priority trends, needs and other issues that should be investigated during the early phase of information gathering.*

> *Develop a starting list of good sources of information - types of experts to seek out for interviews, electronic data base searches that should be done and other trade literature that should be reviewed.*
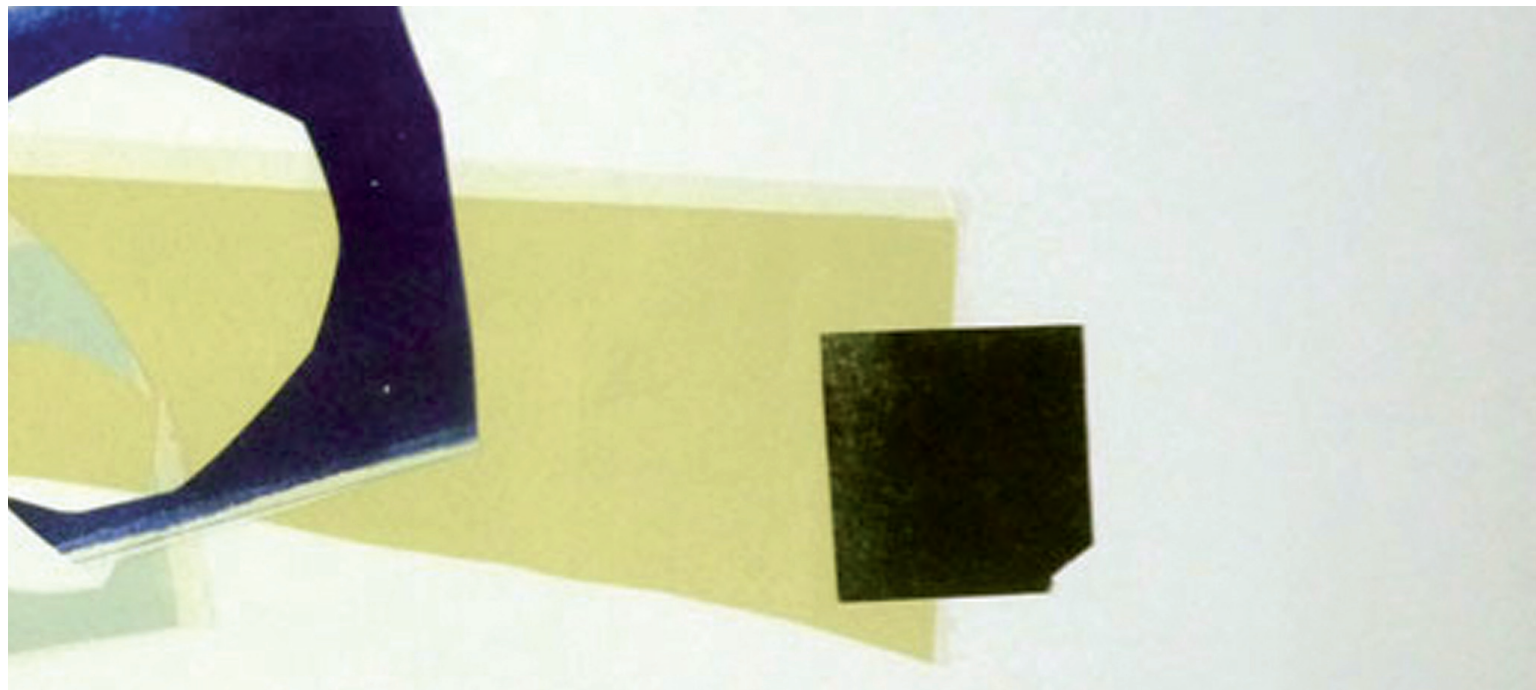
Example: Planning Process of the Hearing Health Project

Let us now look at the major steps involved in developing a data collection plan. The planning approach, used by the hearing health lead user research team, illustrates the general planning process we recommend. As previously mentioned, the focus of the hearing health project was on developing a break-through hearing instrument to address the needs of people with only moderate hearing loss. The team spent two half-day meetings developing a plan before beginning to collect data. A member of the library staff also attended these meetings. The team wanted this person's help in selecting good electronic data bases to search.

The framework used for the planning discussions included three steps:

1. *The team began its planning by generating a list of major trends and other factors that members felt could have implications for the project based on the information they had gathered and the personal knowledge of team members. In this part of the discussion, the team considered the impact of trends in several different fields. For example, these fields include technology, regulation, product usage, demographics. It is important to look at trends in a variety of arenas, because the most promising innovation opportunities in many projects are a result of interacting trends in several different fields.*

2. *Next, using the identified trends as a starting place, the team developed a list of the key types of information it wanted to collect. The outcome of this discussion was a list of high priority trend and market questions that the team intended to explore through interviews with experts and reading.*

3. *Once key information needs were identified, the team developed a specific action plan for collecting data. This planning involved developing a starting list of types of top experts to locate and interview, and creating an action plan to do electronic literature searches.*

2

STEP TWO: IDENTIFYING TRENDS AND KEY CUSTOMER NEEDS

In Step One, the lead user project team did a quick scan of the marketplace as part of developing its initial data collection plan. Now, in Step Two, the team carries out an in depth investigation of major trends and emerging needs of customers in the targeted markets. The trend and need investigation in Step Two is a critical part of a lead user study. In order to identify the correct lead users to help in concept generation, the team must first arrive at a very clear statement of the customer need(s) that will be addressed by potential products or services.

The team's research process in this phase is organized into three major sets of research activities, which have been briefly summarized below.

1. Exploring major trends and emerging needs

> *At the start of Step Two, the team interviews top market experts and scans select trade literature with the goal of identifying major trends that will impact future market demand.*

2. Specifying an important customer need

> *When significant progress has been made identifying critical trends and related needs, the team uses this information to select the specific need area(s) that will be addressed by a new product or service.*

3. Preliminary assessment of the business opportunity

> *Before concluding the trend and need investigation, the team does an informal analysis of the target markets to confirm that the selected needs represent a very good commercial opportunity.*

This sequential listing of activities accurately reflects the flow of Step Two and the shifting focus as the team progresses through its work in this phase. However, it is important for the teams to understand that these sets of activities are not carried out in a simple, linear fashion during an actual project. Rather, the team cycles or "iterates" through them several times during Step Two. For example, the team goes through several rounds of interviewing top experts, reviewing trade literature, and then meeting to think together about how to best combine and interpret the information gathered in a novel way.

Lead user project teams typically devote about four weeks to the research activities of Step Two. During this phase of the project, teams meet weekly to share and discuss what members are learning. They also invest many hours doing individual work, such as interviewing, reviewing trade literature and interpreting the gathered information. In this chapter, we walk you through the research process in Step Two, and provide examples of how actual lead user project teams have gone about the tasks of this phase.

2/1 Exploring Major Trends and Emerging Needs

At the beginning of Step Two, the research team's focus should be on acquiring a thorough understanding of major trends and their probable impact on market needs for new products and services over the next several years. Without very good knowledge of trends, forecasting future market needs amounts to little more than guesswork.

A major challenge for the team is assessing which trends are truly significant. This requires a very good understanding of the dynamics behind the trend. Which events and conditions are driving it? Who is being impacted? What evidence is there that it will have a major effect on future product or service needs? Answering these kinds of questions is an important aspect of the team's work during the trend investigation.

During the early phase of gathering information, emphasis is also placed upon building a foundation in the world of the target customers. What are the needs and problems from the point of view of real world users? What are the views of expert practitioners regarding emerging needs of customers in the targeted markets?

The data collection process of lead user teams includes two primary research activities. First, lead user teams begin Step Two by doing a general review of relevant trade literature. Following this initial reading, the focus shifts to interviewing lead use experts. The reason for this shift is that the very latest and most specialized information on emerging trends and needs is seldom written down. Instead, it is held in the minds of lead use experts. The team accesses this vital information via interviews with a select group of these experts.

The focus now shifts to the specifics of the trend identification process. We begin by discussing how teams typically approach the literature scan in the early phases of Step Two. From there, we provide guidelines for the very critical task of identifying and interviewing lead use experts.

Careful thought should be given to selecting the trade literature that will be reviewed during the first round of information gathering. Otherwise, the team can quickly be swamped with information, most of which may not be helpful to the team.

During the initial literature scan, members should concentrate on reviewing the most recent months of trade journals aimed at practitioners in the fields important to the project. Note that trade journals are not the same as research journals. Trade literature is much more practical, and usually contains good information on trends in the field, as well as the latest innovative applications. Below, a few specific tips on types of literature that are usually useful to include in your literature scan have been listed.

> *Review recent issues of trade journals aimed at practitioners in the target markets. Every industry has two or three top journals in the "must read" category. For practitioners reviewing these will give the team a good sense of "conventional wisdom" regarding major trends and other important industry issues.*

> *Review trade journals aimed at practitioners in advanced analogue industries. In many projects, there are other fields in which experts are doing advanced work in areas relevant to the project. Scanning and discussing ideas in these journals is a great way for team members to start thinking "outside the box" of their usual areas of specialization. In addition, they will give the team ideas on potential lead users.*
> *By way of illustration,*

> *A lead user team studying office lighting reviewed specialized trade journals on industrial lighting and medical operating room lighting during the literature scan. Team members knew that lighting applications in these markets were similar to, but more advanced and demanding than the ones in their target market.*

2/1/1 Literature Scan

2/1/2 Interviewing Relevant Stakeholders

In addition to scanning relevant literature, the research team should also interview lead users within the fields that are relevant for the study at hand. These experts and lead users can provide project teams with three very valuable types of information:

› *Insights into emerging needs*
  - Experts and lead users frequently have finely tuned intuitions about future market demand and a good feel for subtle innovation opportunities, because of their rich knowledge base and personal experiences in the industry.

› *Design information and new product ideas*
  - Experts and lead users are likely to know the most advanced technical work being done in their fields, and often are engaged in leading edge work themselves.

› *Ideas on how to locate other experts and lead users*
  - Experts and lead users tend to have broad personal connections with other technical and market experts and innovating companies.

The lead use experts could be researchers doing innovative work in academic settings; they might be expert industry practitioners or trade journal editors. The critical factor that distinguishes lead use experts from other industry practitioners is their extensive knowledge of cutting edge applications. For example, consider the insight into the future of Internet applications that will be held by some top experts who have worked on a range of the most advanced applications in that field. Their knowledge of the "leading edge" enables them to understand trends, and anticipate future market demand well before most others in the industry. So as to identify the best experts for the purposes of the team's project, it is advisable to employ a "pyramid of expertise." As shown in the depiction below (Level 1-3), there are many people at the base of the pyramid who know something about a field. Yet, only a select few are "the best experts around." The goal is to seek out and interview people who are at the very top of the pyramid with respect to the particular knowledge and insights needed.

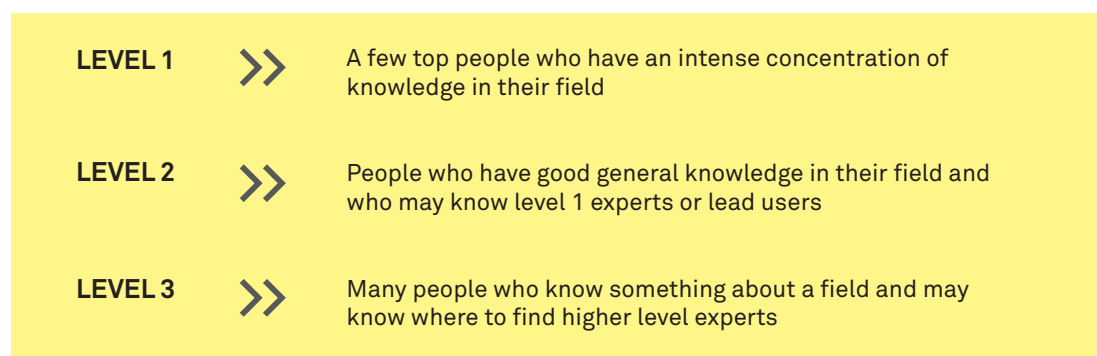|		
LEVEL 1	››	A few top people who have an intense concentration of knowledge in their field
LEVEL 2	››	People who have good general knowledge in their field and who may know level 1 experts or lead users
LEVEL 3	››	Many people who know something about a field and may know where to find higher level experts

Figure 2: Level of Expertise (adapted from Churchill et al. 2009)

As SMEs typically do have only a limited access to leading experts within a certain field, it is useful to make use of a networking approach that will be explained in the following section.

According to von Hippel et. al. (von Hippel, Franke et al. 2009), the identification of individuals with special characteristics within a large population can be carried out using two different approaches. One very common approach is called screening, which requires the researcher to collect information from every subject within a population in order to identify those with the desired characteristics (Sudman 1985). This screening approach is used within a variety of applications, such as marketing, biology, as well as innovation management (Herstatt and Von Hippel 1992; Chen, Pavlov et. al. 2009; Shrivastava, Boghey et. al. 2011). The other approach of identifying individuals with rare characteristics is based on the principle of social recommendation (Spreen 1992). These approaches make use of the social networks of a predefined sample to provide new recommendations to the researcher. This is implied in von Hippel et. al.'s (2009) pyramiding approach - a variant of snowball sampling that has been commonly used in the past (Sudman 1985; Griffiths, Gossop et. al. 1993; Frank and Snijders 1994; Atkinson and Flint 2001). In snowball sampling, an individual with special characteristics is asked to identify another individual with the same number of these characteristics (Vogt and Johnson 2011). In contrast, pyramiding requires that a given individual knows another individual with a higher number of the sought characteristics. Pyramiding is useful if someone wishes to identify an individual with a high number of given attributes in an efficient manner, as it requires only about one third of the effort that screening approaches (von Hippel, Franke et al. 2009).

A pyramiding search typically starts with a list of individuals which possess a high number or level of a certain attribute that the person or company executing the search process (hereafter called researchers) is searching for. In the next step, every individual is asked to name another person that has a higher number of the desired attributes. The researcher then follows this recommendation and interviews the according individual to find out whether the person really possesses a higher level of the required attribute. If the recommended person turns out to have a sufficient level of the desired attribute, the company asks the person for the next expert within the given field. This procedure is repeated until the desired person with a predefined level of the sought attribute is found (von Hippel, Franke et al. 2009).

While the pyramiding approach has been successfully employed within an offline setting, we adapt the approach for use in an online setting (Ebel, Bretschneider, Leimeister 2012a). In doing so, we can access a large network of people, without being forced to carry out telephone interviews, which are part of the present pyramiding approach. Such interviews clearly require a high amount of skilled labour; for example, the cost of identifying one individual is about $1,500. (von Hippel, Franke et al. 2009). To our knowledge, no prior work exists in which a pyramid search is conducted within an online setting. However, there are comparable works within the scientific literature that provide insights for our research project. The work most similar to our endeavour has been carried out by Dodds et. al. (2003). The authors conducted an email-based "small world" procedure, in which they attempted to reach 18 persons from 13 countries by forwarding messages from acquaintances. The participants of this study were told to reach a predefined subject by forwarding an email to a social acquaintance that they supposed to be closer to the subject than they were. As a result of this work, Dodds et. al. (2003) found that successful search chains are primarily conducted through relatively weak ties. Moreover, these chains do not require highly connected hubs, nor are they bound to a certain type of network structure, which contrasts prior research within the field of network theory (Newman, Strogatz et al. 2001; Strogatz

2001; Newman 2003).

Another important finding is the fact that successful chains primarily made use of professional relationships. We employed this finding within our work by trying to access business networks when searching for idea contributors for a virtual idea competition. We thus hoped to overcome the relatively low participation rate of online-based surveys, which in 1999 decreased to 31% (Sheehan 2001). Another major problem occurs when the completion rate of Dodds et. al. (2003) is taken into account. The authors reported that only 1.6% of their search chains reached the target.

However, our pyramiding search differs from the study of Dodds et.al. in two aspects. First, we do not rely on personal acquaintances when searching for idea contributors; rather, we advise the participants of the search to pass the message to every person within their professional network, regardless of whether they know each other personally or not. Further, pyramiding requires the researcher to follow the chain in order to control whether the identified individuals' possess a sufficient level of the desired criteria (von Hippel, Franke et al. 2009). Thereby, the researcher has the possibility of actively supporting the completion of the search chains by motivating the identified persons to participate. The way we incorporated the mentioned findings into our research endeavour will be part of the next section, which describes the way we adapted the pyramiding approach for use in an online setting.

Regarding the existing procedure of conducting a pyramiding search, two principles can be identified. First, pyramiding requires the researcher to move up the pyramid and identify people with a higher level of the desired attribute. This principle distinguishes pyramiding from the similar approach, snowball sampling, within which an individual is asked to name a person with the same level of the given attribute. We thus left this principle

unchanged when adapting the pyramiding approach for use in an online setting. The second principle is the application of a sequential process to identify people with the desired characteristics. Pyramiding incorporates serial experiments (Thomke, Von Hippel et al. 1998), which enable the researcher to learn from one step to another (von Hippel, Franke et al. 2009). In addition, these serial experiments give the researcher the possibility to determine whether he is moving up the pyramid. As the researcher interviews every recommended person to find out whether he really possesses a higher level of the sought attribute, he is able to confirm that he is really ascending the pyramid. Previously, this has been done with the help of telephone interviews, in which the researcher can carefully examine the characteristics of the identified individual. As these interviews require a considerable amount of skilled labour, we substituted them with standardized messages. For this purpose, we prepared a letter (Appendix 1) in which we asked participants to name one individual who had a higher level of the desired characteristics. To find out whether the recommended person really possessed a higher level of the according attribute, we used a questionnaire that studies the desired characteristics. The results of the questionnaire were then compared to the results of the previous individual. If the individual achieved the desired level of the searched characteristic, the particular person would be invited to participate in the idea competition.

In order to test the resulting recommendations, we used a questionnaire, which was developed by Span et. al. (2009). Each item was evaluated with the help of a five-point rating scale. To check whether the individuals possessed a higher level of the desired characteristics, we asked them for a self-assessment of the characteristics. If the recommendation was correct, we asked the identified person to recommend another individual with a higher level of the

three characteristics mentioned above.

The search itself was conducted in a virtual social network, where the network messages could be easily sent to different individuals without any media disruptions. Furthermore, people within a social network have access to a large network of other individuals. Taking into account that successful search chains in previous works were disproportionally based on business contacts (Dodds, Muhamad et al. 2003), we conducted our search in the social network, Xing, a social networking site mainly used for business purposes.

≪ *End of Research Notes*

2/1/3 *Identification of Lead Users*

To identify the leading experts within the desired field we recommend executing the following five steps:

1. *Contact the stakeholders that have been identified in the previous step, and ask them to recommend an expert within the desired field*

2. *Follow the recommendation to check whether the person really is an expert*

3. *Ask for another recommendation*

4. *Analyse the gathered data*

5. *Cluster the identified persons in order to identify lead user*

In the following section we will explain the above named steps in more detail. The research team should start with the stakeholders that have been identified during Step One. The search itself was conducted in a virtual social network. In order to increase the accessible network, and due to the fact that the messages could be easily sent to different individuals without any media disruptions, we recommend conducting a pyramiding search within a virtual social network.

The pyramiding approach is based on the assumption that people with a high interest in a given field are likely to know other people that do know more than they do about the same topic. A pyramiding search typically starts with a list of individuals that are known to the research team. In our case, the research team should start with the previously identified stakeholders, because they are often well-connected in the industry, and they may know top experts that would be useful to interview during the project. In the next step, every stakeholder is asked to identify another person that has a higher number of the desired attributes. In order to do so we recommend sending the following questionnaire to every stakeholder. The questionnaire should include a brief explanation of its purpose, the company's affiliation and the required characteristics that have been proposed by Spann et. al.(2009).

Example: Questionnaire that can be used to identify experts within the desired field

Dear [Name of identified stakeholder],

As mentioned within our discussion about emerging trends and needs within the field of [topic that has to be assessed], we are currently searching for leading experts and their views about emerging trends within the field.

As we think you might know other Xing members who are social media experts as well, we would like to ask you the following question:

Which of your contacts in Xing has the most knowledge and experience in the field of [topic that has to be assessed]?

To give you some assistance in recommending a person, we have listed some characteristics that the recommended person should possess:

> *In a discussion about [topic of interest], your friend would most likely convince others of his ideas.*

> *When your friend talks about [topic of interest], he gives a great deal of information.*

> *Overall, in all of your discussion with others, your friend is often used as a source of advice.*

> *[Topic of interest] consumes a large portion of your friend's time in relation to other hobbies.*

> *Your friend is dissatisfied with the recent solutions in [topic of interest].*

Please note that the points above should just be used for orientation, and are not mandatory for your recommendation.

I would appreciate it very much, if you would recommend some of your contacts. Further, I would be very pleased if we could keep in touch and further discuss actual developments within the field of [topic that is to be assessed].

thank you very much for your support.

Yours sincerely,

XXX

The researcher then follows this recommendation to find out whether the person really possesses a higher level of the wanted attribute and to collect further information about future trends and needs. The following questionnaire can be used for this purpose.

Dear [name of the recommended person],

Thank you very much for your positive feedback.
We are currently searching for leading experts and their views about emerging trends within the field of [topic that has to be assessed]. Therefore, we would like to ask you the following four questions.

1. What do you think are the most important trends that will shape the future of X product or service category?

2. Why do you think so? (Please name concrete examples and the reasoning behind your view.)

3. What applications are at the leading edge of the trends you have listed?

4. Which firms and/or which individuals do you think are doing the most advanced work in the application areas you have listed?

In addition, we would really appreciate if you could answer the following seven questions. If you assess yourself, to which extent do you agree with the following statements:

1. In a discussion about [topic of interest], you would most likely: listen to your friends' ideas/convince your friends of your ideas

2. When you talk to your friends about [topic of interest], do you give: very little information/a great deal of information

3. In discussions about [topic of interest], which of the following happens most often: your friends tell you about the topic/you tell your friends about the topic

4. Overall, in all of your discussions with friends and neighbours, are you: not often turned to for advice/often turned to for advice

5. [Topic of interest] consumes a large portion of my free time in relation to other hobbies: totally disagree/totally agree

6. [Topic of interest] is very important to me compared to other topics I'm dealing with: totally disagree/totally agree

7. I am dissatisfied with the recent solutions in [topic of interest]: totally disagree/totally agree

Thank you very much for your support in the study!

Best regards,

XXX

Once the questionnaire has been returned, you should ask the identified person to recommend the leading expert within the desired field. This procedure is repeated until no further expert can be identified. As the identification of lead users is completely based on standardized messages, there is no possibility of checking whether the chain had been cancelled, unless the person informs you explicitly. For this reason, we recommend installing a rule to judge whether a search chain has been cancelled. In this way, every identified person should be contacted three times within a period of three weeks. If the person did not respond within this span of time, the search chain should be judged as cancelled. After the data collection has been completed, the research team starts to analyse the gathered data. In order to do so, the mean value of every category has to be calculated. Thereafter, every individual can be clustered by comparing its results to the mean value of the whole sample. If the person is above average, they can be considered as a lead user, and might be a good participant for the product generation workshop that is part of Step 3.
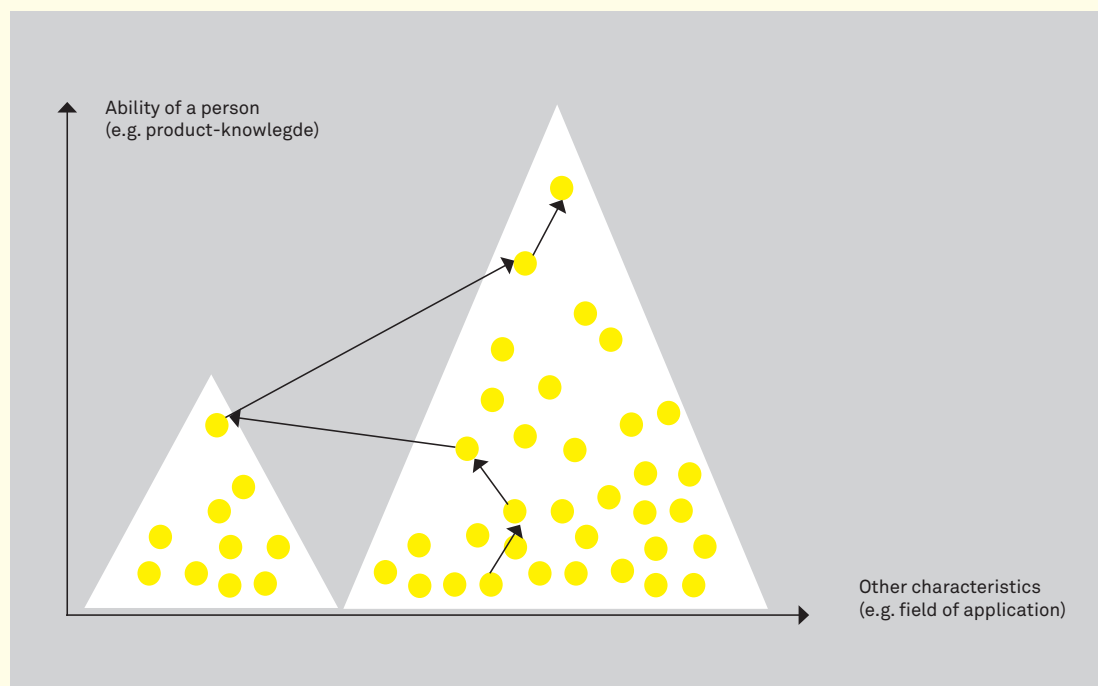
The figure below illustrates the described approach.

Figure 3: The Pyramiding Approach (according to Hippel et al. 2009)

2/2 Framing an Important Customer Trend

After the identification of lead users has been finished, the team has to consolidate the entire trend and market information that has been collected with the help of the questionnaires. The next major team task is to "frame" the need area(s) that will be the focus of the remainder of the study. We discuss this very critical activity next.

"Framing" the need essentially involves selecting and clearly defining the specific customer needs that will be the focus of the concept generation. To accomplish this, project teams go through a process of assessing, creatively interpreting and combining the market information collected.

An initial "need framing" is commonly done about two weeks into Step Two. At this point, teams often frame two or three need areas, and then collect more data before ultimately seeking the specific need(s) that will be the focus of the concept generation.

The outcome of the need framing process should be a clearly formulated description of these elements of the need area selected by the team:

> *Target customer groups - Precisely define the primary groups of people who will be served by the new product or service to be developed.*

> *Core need to be addressed - Develop a clear need statement that captures the essence of the need(s) that the team has elected to focus on.*

> *Key attributes of the identified need - List the specific attributes that the new product (or service) will ideally address, based on the data collected to date.*

The need-framing that was created by the medical products team in Step Two illustrates a clear and complete description of the need area:

Need-framing-Future Cloud Computing Service

Target Customer Group	SME's inside and outside Germany
Core Need to be Addressed	Increase of users trust into the new cloud computing service
Key Attributes of the Identified Need	> *highly transparent* > *high security requirements* > *high usability*

<u>How should members prepare for need-framing sessions?</u>

Immediately before the session, we recommend that each member do the following:

› *Reread the interview notes, as well as any articles, etc. that you found to be potentially relevant.*

› *Give special emphasis to a review of the notes from your own interviews. This will refresh your recollection of the additional detailed impressions that were not written down, but may be useful in the need-framing session.*

What should teams do during a need-framing session? The general steps that teams typically follow in a need-framing session include the following:

1. *At the start of each need-framing session, members should take turns presenting and discussing the trend and need information that stands out as important to them. Members should complete their individual presentations before moving on to a general team discussion.*
2. *Next, a team discussion should ensue in which members put forward possible ways to combine the information presented into a clear description of the core needs that may be important to address from the viewpoint of customers.*
3. *The team then assesses the fit of the various need-framings with the business goals of the company and selects the one or two most promising need framings that were proposed.*
4. *Before adjourning, the team should assess the additional information that is needed to determine if the selected need areas represent a good commercial opportunity.*

After the need-framing session a member of the team should write up a clear description of the need-framings that were achieved during the session.

2/3 Assessing the Business Opportunity

Before concluding Step Two, lead user project teams create a very preliminary "business case", in order to begin answering the question: Is there a profitable product or service opportunity for our company in the identified need area(s) and targeted markets? A more complete business case is created once the team has generated actual product or service concepts (see Chapter 6).

During Step Two, lead user teams usually collect the following business case data:

> *Market data that is readily accessible (e.g. on-hand at the company). Here teams seek preliminary answers to the questions: What is the approximate "size" of the need in the targeted market(s)? and - Is the market growing and big enough to meet the business goals for this project?*

> *Data on major competitors. In this area, a key question to be answered is: Will potential products (or services) give us a long-term and sustainable advantage over our competitors?*

Project teams also meet with key managers before moving on to the next phase to check out if the selected need areas are consistent with their views on important market trends and needs.

At this point in the project, teams cannot do a thorough assessment of the business potential for products or services, because they do not yet know the forms they will take. However, an informal "reality check" is generally adequate to ensure that the team is on the right track with the needs it has selected. In this next phase, the team will interview lead users to gain a more precise understanding of the attributes associated with the focal needs that matter the most to the targeted customers. In Step Three, the team will also collect further data to validate the business potential of the needs identified in Step Two.

3

STEP THREE: *DEVELOPING NEW PRODUCT CONCEPTS*

The work in this concluding phase of lead user projects is especially exciting and rewarding for teams - this is where it "all comes together." During Step Two, the project team established core product or service requirements, and identified some solutions to address them. Now, in Step Three, the team further improves and evaluates various solutions with the goal of arriving at a strong final product or service concept(s).

An important activity of this phase is the lead user workshop. This is a two or three day event in which a select group of lead users and lead use experts join the project team to do intensive design and problem solving work together. The overall purpose of the workshop is to improve, and add to the solution concepts identified through interviews and other concept generation activities in Step Three. After the workshop, the team finalizes the concept(s) that were obtained in the lead user project. The last major task of Phase Four involves developing and presenting a written new product or service proposal to management for review.

3/1 Preparatory Activities

3/1/1 Learning from a Lead User Workshop

Teams have found the workshop to be an efficient way of improving the solution concepts that were generated in Step Three. In most projects, the solutions that teams have developed thus far are strong in some areas, but need to be improved in others. The basic purpose of the workshop is to fill in the missing pieces in the team's solutions. The following are three examples of how workshops are often used:

› *After having concluded Step Three, teams are frequently not satisfied that they have thoroughly explored the entire new product or service possibilities, even though they have preliminary solution concepts. Thus, the workshop is often used to develop additional product or service concepts, in order to ensure that the team's final concept(s) is truly a "breakthrough".*

› *The workshop can be used to solve specific design problems, as opposed to developing entire product or service concepts. For example, in the case of one project, the team felt confident by the end of Step Three, and was convinced that the preliminary concepts did*

a good job of addressing product requirements in most ways. However, there was one area in which critical design problems had not been satisfactorily solved. Thus, the team decided to use the workshop to develop solutions to these problems.

› *The workshop can also be used to develop solutions to problems related to implementing the team's overall new product or service strategy. For example, the team might choose to focus the workshop on developing specifications for a novel marketing or distribution method, or it could be aimed at designing a novel manufacturing process that may be required to produce the new product.*

In order for a workshop to be productive, a great deal depends on giving careful thought to what the team wants to accomplish during this activity. In a later section, we look in detail at how to best approach this task.

The value of the workshop lies in the project team, innovative product users and top lead use experts doing interactive design and problem-solving work together. In brief, this is what happens during lead user workshops. Over a two or three day period, participants go through a carefully constructed process in which they do joint design and problem-solving activities as an entire group and in small breakout groups. In doing this coordinated work together, the diverse mix of highly qualified people enables the group to develop high quality solutions, and that in a short period of time.

To get a better sense of why the workshop is so valuable, let us look at the nature of the participants and activities in a typical workshop in more detail.

3/1/2 Determining the Workshop Focus and Purposes

Deciding upon the focus and overall information goals of the workshop is the most critical phase of planning, because this decision will channel the selection of participants. The specific questions to be answered are:

1. *Which design problems will be worked on during the workshop and*

2. *What do we want the specific results of the workshop to be?*

The workshop focuses on a careful assessment of the strengths and weaknesses of the team's preliminary solutions. One good way to begin this task is to create the following two-column chart:

❯ *First, list the core product and service requirements that were established in the previous phase. These should be expressed in terms of the functions and features the team intends to deliver with the new product(s) or service(s).*

❯ *Next, identify and list the critical areas in which the solutions generated thus far do not satisfactorily address these requirements. Here, it is especially important to consider these questions:*

1. In which areas are our solutions "just okay", but not really revolutionary? and

2. In which areas are we missing essential design details or facing design problems that we have not been able to solve satisfactorily?

Once the missing pieces of solution information have been determined, the next step is to select the specific design problems to be worked on and the goals of the workshop. In making this decision, it is crucial to take these two important factors into account:

❯ *What can realistically be accomplished in a 2-3 day period? Teams commonly make the mistake of setting goals that are too ambitious given the time constraints of the workshop. As a general rule, plan to work on no more than one or a few related design problems. Another workshop can always be held if there are several different areas in which ideas for solutions are needed.*

❯ *Which design problems match the capabilities of likely participants well? This is one of the most important factors to consider when selecting the problem areas that will be the focus of the workshop. Although the team does not have a finalized workshop roster at this point in the planning, members will have a good sense of the types of solution ideas that lead users and lead use experts can offer from interviews in previous phases.*

The point we want to emphasize is to select a focal task that can realistically be completed. Moreover, one that can be finished within the time period set for the workshop while simultaneously maintaining a high level of quality.

3/2 Selecting Workshop Participants

Once the team has an approximate idea of the major workshop activities, members begin the process of selecting and inviting participants. In this section, we first provide an overview of who attends a workshop and how teams select participants. Then we shift our focus the specifics of the selection process.

3/2/1 Typical Attendees of a Lead User Workshop

Typically, fifteen to eighteen people participate in a lead user workshop. About eight or ten of these are lead users and lead use experts. The rest of the participants include the project team members and other technical or market specialists from within the sponsoring company.

In our experience, fifteen or sixteen people are the right size for a very productive workshop. The group is large and diverse enough to have a good range of various kinds of expertise and experiences needed for the task at hand. Yet, it is still small enough to enable effective and efficient group problem-solving activities. However, it should be noted that very good work has also been done in workshops with fewer than fourteen and more than sixteen people.

3/2/2 The Selection Process

The process of recruiting workshop participants involves these activities:

> *In a series of planning meetings, the team assesses the mix of capabilities that must be represented in the workshop group to do high quality solution work, and then establishes criteria for recruiting appropriate people.*

> *Next, members identify lead users and lead use experts who fulfil the selection criteria. Usually, some appropriate candidates have already been identified among those interviewed in previous phases. However, teams typically must do further searching to fill out the workshop roster. This is done using the networking process that has been described in earlier chapters.*

> *Before making final workshop selections, team members interview each candidate to make a final assessment as to whether each person is an appropriate choice. During these interviews team members should explain what will happen at the workshop and go over the contractual agreements required of participant.*

Teams usually have several planning meetings to prepare for recruiting participants. In these meetings, the following major decisions must be made.

1. What criteria should be applied in selecting lead users and experts?

2. Who will be the company participants?

3. What contractual agreements should be made in the areas of compensating participants, confidentiality and assigning intellectual property rights?

This work can typically be accomplished roughly in one half-day meeting. Next, we walk you through the selection process and provide guidelines for doing this work.

3/2/3 Selecting the "Right" Lead Users and Lead Use Experts

Clearly, the success of the workshop depends on assembling a group of people with the various skills and knowledge required for the workshop task. It is, therefore, critical for the team to carefully assess the capabilities to seek out in lead users and lead use experts, as well as company specialists. The lead user can be selected based on the results of the identification that has been executed in the course of Step 2. Additional criteria for selecting among the identified lead users are provided below.

> *Decide the types of expertise that should be represented in the workshop group. One simple way to tackle this work is to first make a list of the various types of technical*

and market expertise that will be required for the design work that will be done at the workshop. Then list the types of specialists who have the required capabilities (or the names of people already identified who have this expertise). The goal of this step is to create a master list of all the various different types of specialists that the group intends to recruit for the workshop.

> *Decide which other capabilities lead users and lead use experts must have to make important contributions to the group's work. Next, the team should agree on other characteristics to seek out in lead users and lead use experts. In this area, one major criterion for selecting participants should be which people have innovative and important ideas to offer. Ideally, team members will be able to find lead users and experts who have done innovative work, or are involved in developing major innovations that are relevant to the project. If actual innovators cannot be located, at minimum, the team should seek out people who have thought of novel approaches that can be applied to the workshop task.*

It is also important for the team to consider the personal qualities that participants must possess to effectively do collaborative design work in a group setting. In this area, we have two common sense tips to offer. First of all, people who participate in the workshop must be willing to fully share their ideas with the group. In addition, participants must be flexible in their thinking. Clearly, someone with an attitude of "my way is the only and best way" is not the kind of person one wants in the workshop group. Of course, there is no way to be certain that all participants will have the qualities required to be an effective group member. However, during the selection interviews, team members will usually be able to spot those people who would have great difficulty working well with other participants.

3/2/4 Selecting Company Attendees

As with selecting the external attendees, the team should give careful thought to considering which company members should be included in the workshop. These selections should be guided by two questions:

1. *Which kinds of company expertise must be represented for the group to do productive solution work, and*
2. *Who are the most knowledgeable people with respect to the expertise needed?*

Obviously, it is also important to select people from the company who have the personal qualities required to collaboratively work with others in the workshop. In particular, they should not suffer from the attitude "If it's not invented here, I'm not interested."

Usually, about six or eight employees, including the project team, are fully participating workshop participants. Sometimes, one or two others from the firm also attend as listeners. The project leader or another team member typically serves as the group facilitator. We discourage teams from using an outside facilitator, because of the project-specific knowledge required to effectively lead group discussions.

All team members should be present, for it will be the team's job to incorporate ideas generated in the workshop into final concepts. Further, the group will rely on team members to provide direction about the targeted markets and the nature of the solutions the team is seeking.

The other employees who attend the workshop should be people who have technical or marketing expertise that is not present within the project team. For example, sometimes it may be important to include an in-house specialist in manufacturing processes, or a person from the sales department. The following are two additional factors to consider when selecting participants from the company:

> *Which people will be responsible for carrying forward the output of the lead user project? It is almost always a good policy to include key people from the company who will actually play a major role in implementing the output of the lead user project.*

> *Can the participants from the company attend all workshop sessions? Workshop participants should only be selected from those who can certainly dedicate the time to participate in every session. Due to the fact that the workshop is designed as a series of sequential problem-solving activities, it would disruptive to the work of the group if people are unable to attend the entire workshop.*

Teams usually know which employees have the expertise needed in the workshop, and can quickly agree on which ones to invite.

3/2/5 Contractual Agreements with External Participants

Lead users and lead use experts should be offered an appropriate fee for their participation in the workshop. They should also be required to sign an intellectual property rights agreement, which gives the company ownership of concepts developed during the workshop. This is usually done on forms acceptable to company attorneys, who are responsible for intellectual property rights matters.

In general, potential invitees who are not willing to sign over intellectual property rights to the company should not be invited. There are almost always other workshop candidates with equivalent information who are willing to participate on company terms for good reasons of their own.

3/3 Execution of the Workshops

Research Notes >>

Within a lead user workshop, the identified participants are developing new product concepts related to the identified trends. Finally the results of the workshops are evaluated according to the developed success measures. In order to develop a highly scripted workshop that makes use of the thinkLet concept, we used a procedure that was proposed by Churchill et. al.(2009). The procedure is depicted in the figure below.

Presentation of the problems to be solved and the desired outcomes

Introduction of participants

Discussion about trends within the field

⟩ Warm Up

Generation of sub-problems

Prioritisation of sub-problems

Collection of leading edge technologies to solve the sub-problems

⟩ Break Down of problem into sub-problems

Formation of sub-groups

Elaboration on sub-problems

⟩ Solution to sub-problems

Presentation of elaborated solutions

Evaluation and annotation of solutions

Refinement of solutions necessary? — YES

⟩ Refinement and evaluation of solutions

NO

Final evaluation of elaborated solutions

Combination of solutions to one final concept
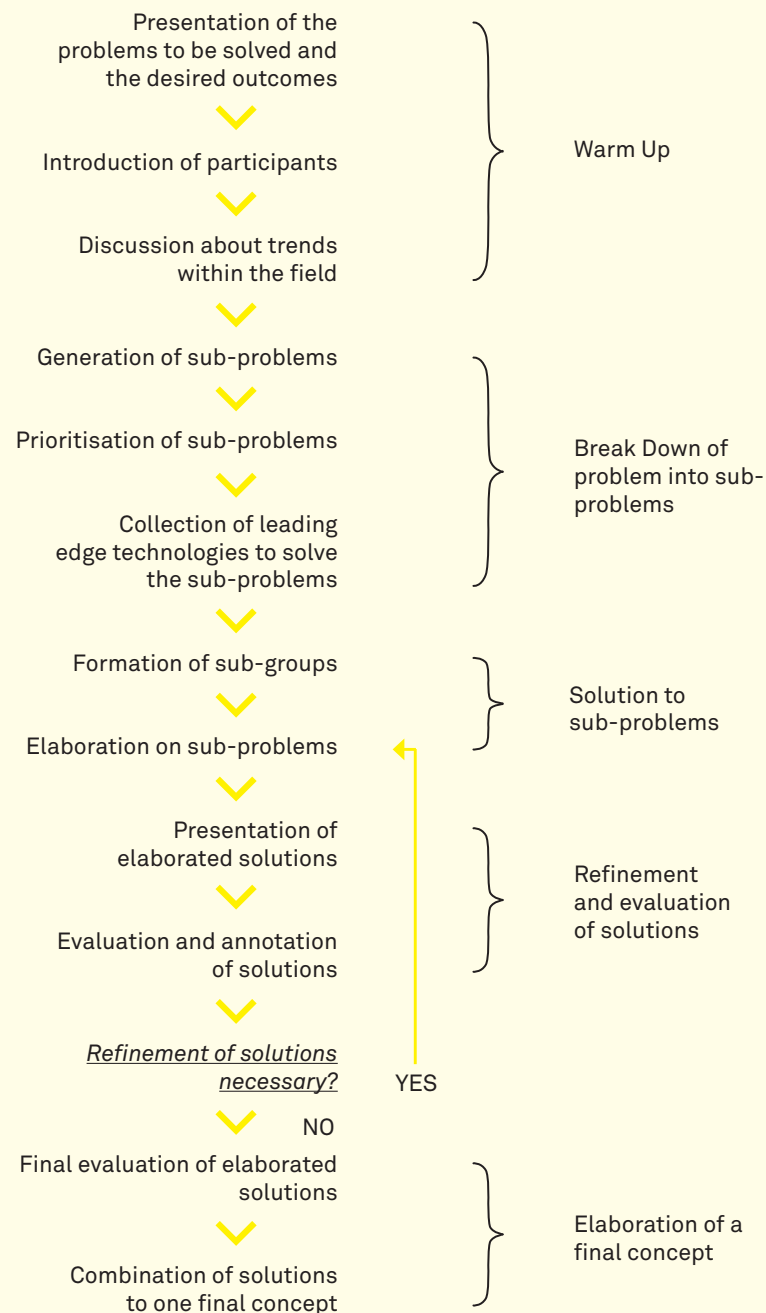
⟩ Elaboration of a final concept

Figure 4: Procedure of a Lead User Study

Even though this procedure comprises all activities that are necessary to conduct a lead user workshop, some important questions still remain unanswered. Among them are the following questions: Which technique should be used to conduct the activities within the workshop? Which tools should be used to conduct the activities? What are the participants expected to do and say within the activities? However, leaving these questions unanswered would contradict our purpose as we intend to provide SME's with detailed instructions on how to conduct a lead user workshop. The goal is to enable them to make use of the approach without being dependent on specialized facilitators. Moreover, by providing detailed instructions about the techniques, tools and behaviours within the several workshop activities, we aim to eliminate as many variances as possible (Ebel, Bretschneider, Leimeister 2012b). Doing so would not only give us the possibility to compare the results of several workshops, but would also enable us to selectively modify the workshops to gain new scientific insights into the characteristics and mechanisms of a lead user workshop. One possible approach to generate detailed instructions for a lead user workshop is the application of collaboration engineering, which we will introduce in the following subchapter.

Collaboration Engineering

Collaboration Engineering has its roots in the observation that while some groups can be highly successful working together, other groups struggle with the challenges that are related to team work (Nunamaker, Dennis et. al. 1991, Leimeister 2013). Examples for these challenges are social loafing, the dominance of particular group members or coordination problems due to the size of the group. Therefore, in many cases professional facilitators are employed to over-come these challenges, and to ensure that the group work is executed in a successful

manner (Phillips and Phillips 1993). However, these facilitators are expensive as they mostly have to be hired by external consultancies. As a consequence, Collaboration Engineering emerged in order to enable groups to execute collaboration processes without the intervention of a professional facilitator, and to come up with predictable results (Kolfschoten, Briggs et al. 2006). Therefore, Collaboration Engineering intends to codify facilitation interventions, and to provide them to practitioners in a reusable manner. These building blocks are called thinkLets (Briggs, G. et al. 2001; Kolfschoten, Briggs et al. 2004; Santanen 2005; Kolfschoten, Briggs et al. 2006). According to Briggs et. al. (2001), thinkLets are a named and packaged facilitation technique, which create predictable and repeatable patterns of collaboration among people working towards a goal. For this purpose, thinkLets typically consist of three components: tool, configuration and script. The tool component comprises instructions concerning the materials that should be used within the collaboration process. These materials range from flipcharts and whiteboards to digital technologies, like group support systems. The way these tools have to be used, and how they have to be adjusted is part of the configuration section. The script of a thinkLet determines how the leader of the group has to act to bring the collaboration process to a successful end. With the help of thinkLets, it becomes possible to divide even complex collaboration processes into small units. Thereby, predefined modules are generated that enhance the structuring and comprehensibility of the process (Briggs, G. et al. 2001). In the past, thinkLets have been successfully used to serve different purposes. Appleman and van Driel (2005) used thinkLets to design a crisis-response process which can be executed without the intervention of a professional facilitator. In an experiment conducted in collaboration with the U.S Army, Harder and Higley (2004) were able to show that thinkLets can be

used to successfully develop a simple and complete documentation of a collaboration process. In addition to these examples, de Vreede and Briggs (2005) used thinkLets in an similar case compared to the situation at hand. They successfully used thinkLets to train practitioners of a large financial service organization to conduct a large number of risk management workshops without being dependent on a professional facilitator. Given these examples, we are confident that using thinkLets to design a lead user workshop would enable SME's to understand how these workshops work, and to reproduce them without being reliant on highly specialized and expensive facilitators. In order to come up with a thinkLet based workshop concept, we used the Collaboration Process Design Approach, which was proposed by Kolfschoten et. al. (2009). This design process will be part of the next section.

Methodical Approach

In order to capture all aspects which influence the design of collaborative tasks, the Collaboration Process Design Approach (CPDA) was developed by Kolfschoten & de Vreede (2009). This method makes it possible to develop collaborative tasks systematically (Leimeister 2013).
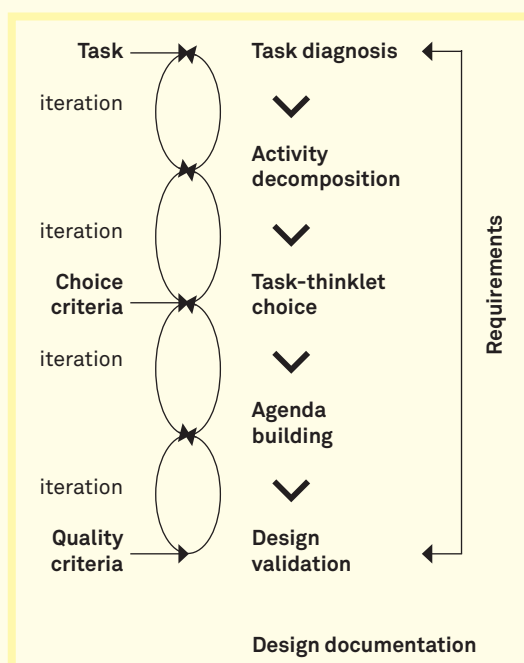
As presented in the figure above, the CPDA contains five repetitive steps. First of all, an analysis of the performed tasks is carried out within the scope of which the characteristics of the group are analysed. The second step consists of dividing the whole process into several, smaller activities. Subsequently, the selection of suitable thinkLets follows in the third step. The fourth step deals with the development of a program sequence for the workshop. The last step of the CPDA involves the validation of the design, meaning this step is supposed to evaluate if the process delivered the intended results. The ensuing subchapter will examine each step individually. The resulting design recommendations are oriented towards the initial lead user workshop concept (Churchill, von Hippel et al. 2009).

Development of a ThinkLet-Based Workshop Concept

Diagnosis

Analysis of Tasks

In the course of the task diagnosis, the aim of the workshop, the intended results, the quality criteria to control the results, as well as the further application of the results are examined. In the case of a lead user workshop, the aim is to uncover the participants needs, and to convert them into innovative products (Von Hippel, 1986). Based on this aim, the intended results can be derived (Briggs, Kolfschoten et al. 2009). In a lead user workshop the results consist of innovative concepts and prototypes, which are accepted by the group, rated in terms of quality, and prepared for further use (Churchill, von Hippel et al. 2009). The corresponding quality criteria include the fulfilment of customer needs, the technical and economic feasibility as well as the novelty of product concepts.

Figure 5: The Collaboration Process Design Approach (according to Kolfschoten et al. 2009)

Analysis of Stakeholders

The next step focuses on the analysis of the stakeholders of the process in terms of who is supposed to participate in the process and what kind of purpose they pursue (Kolfschoten and de Vreede 2009). Typically, eight to ten participants, who are supposed to represent different demographic characteristics, work together to reach the intended results in a lead user workshop. Additionally, three representatives of company personnel who have solid technological knowledge and sufficient marketing skills and three representatives of company personnel who have planned the workshops are supposed to participate. In this study, we invite 15 individuals to participate in the workshop, so as to be able to divide them into subgroups without losing heterogeneity within the individual sub-groups (von Hippel 1986). After the number of participants is determined, it is necessary to analyse the objectives more precisely as well as the capabilities and skills of different participants. A support of participants' goals is inevitable as the degree of coverage between private goals of participants and the defined objectives of workshop determines their satisfaction, their commitment and the success of the group (Briggs, Kolfschoten et al. 2005; Briggs, Kolfschoten et al. 2009).In the case of the lead user, this level of coverage can be viewed as high, as lead users are awaiting the workshops' results in order to cover or consider their so far unsatisfactory be needs (von Hippel 1986). Furthermore, lead users expect to gain additional insights by attending the workshop, and are keen on getting involved in the product development process of a company. Concerning the individual goals as well as the capabilities and skills of the companies' employees, the project team should make sure to integrate open-minded employees for which the opening of the companies' product development process is not a thread (Briggs, Reinig et al. 2008). In addition, employees should have a positive mutual past to ensure that that group work will not be disturbed by possible negative influences from the past.

Resource Analysis

The next step in CPDA is an analysis of resources needed for carrying out the workshop (Kolfschoten and de Vreede 2009). Besides the time required executing the workshop, which could be scheduled within two days, a working space in which the workshop should take place has to be determined. Within the scope of the lead user workshop, participants work jointly to solve the problem without any differentiation between the participants. Therefore, it would be recommended to arrange sitting places in a circle. It should be open from one side, so as to offer participants a common focal point (Lewe and Krcmar 1993; Jay F. Nunamaker, Briggs et al. 1996). In addition, it is also necessary to take the room size into consideration. Besides the working space, it is necessary to provide a space for the informal communication of participants, so-called social space, especially concerning meetings that last more than half a day (Jay F. Nunamaker, Briggs et. al. 1996).

Facilitator Assessment

The final point which is supposed to be studied within the diagnosis of tasks is stated by Kolfschoten et. al. (2009), namely the selection of suitable facilitators who will be in charge of the lead user workshops. Hereby, attention should be paid to the fact that facilitators should have experience in carrying out group meetings and must have social and analytical skills (Niederman, Beise et al. 1996) as well as the required knowledge to help participants in case of comprehension problems.

Division of Tasks

Once all requirements for carrying out workshop have been determined, it is possible to start dividing the whole process into separate activities (Kolfschoten and de Vreede 2009). For this purpose, it is possible to refer to existing standards or relevant literature. If both of them are unavailable, the researcher has to design separate activities from scratch.

In case of the lead user approach, a procedure, which has been researched for more than twenty years, has been documented (Churchill, von Hippel et. al. 2009). This documentation provides a sequence of activities which enables the achievements of the tasks if carried out by an experienced facilitator. However, further improvements of activities in patterns of collaboration as well as techniques and scripts (Briggs, Kolfschoten et al. 2009) have not been carried out yet. According to Briggs et. al. (2001), such classification is essential to succeed in a workshop process. Moreover, it is needed to eliminate the external influences, and, thus, achieve predictably. Accordingly, the twelve activities of a lead user workshop, which have been documented by Churchill et al. (2009), will be further refined to obtain a standardized procedure of the workshop. For this purpose, thinkLets, which could be referred to as facilitation techniques, will be used. With the help of thinkLets, it will be possible to produce predictable and repeatable patterns of collaboration among participants of the lead user workshops (Briggs, Kolfschoten et al. 2009). Moreover, the transferability of the design will be simplified, and the knowledge, which is necessary for the facilitation of the workshop, will be reduced (Kolfschoten, Briggs et al. 2006; de Vreede, Briggs et al. 2009).

Allocation of ThinkLets

In order to allocate suitable thinkLets to the activities, the desirable results of the activities have to be analysed. The selection of particular thinkLets is based on a comparison of the intended results of the various activities in a lead user workshop (Churchill, von Hippel et al. 2009) and the results that can be expected from the respective thinkLets (Briggs and de Vreede 2009).

Developing an Agenda

After the necessary thinkLets have been identified by means of implementing the processes, they should be transferred to an agenda for the workshop (Kolfschoten and de Vreede 2009). This agenda includes not only individual activities of workshop, but also predefined breaks and presentations as well as the required time.

≪ *End of Remarks*

After the preparation activities are completed, it is time to conduct the lead user workshop. The overall purpose of the workshop is to improve and add to the solution concepts identified through interviews and other concept generation activities in Step Three. After the workshop, the team finalizes the concept(s) that resulted from the lead user project. The last major task of Step Four involves developing and presenting a written new product or service proposal to management for review.

Lead user workshops usually begin in the afternoon and are spread over three days. The actual amount of group work time is about two and a half days. The workshop is designed to move from creating a common understanding of the overall task to systematic and efficient problem solving. The major problem-solving segments in a typical workshop include the following:

1. *Establishing a common context for the work*

2. *Decomposing the overall task into sub-problems*

3. *Generating solutions to sub-problems*

4. *Improving and evaluating solutions*

5. *Combining and finalizing solutions*

Let us now look at the various types of activities which take place in each of these segments. In doing so, we will provide an insight into the purpose of the activities and propose an agenda for every step. These agendas include the name of the activities, a short description of their purpose, as well as the recommended thinkLets that should be executed in the course of the activity. The corresponding thinkLets can be found within the attachment.

3/3/1 *Establishing a Common Context for the Work*

Workshops start out with a series of activities designed to introduce participants to the task and "get them into it" as quickly as possible. These are the major activities that take place in the introductory segment. First, the facilitator starts out by briefly explaining the overall task; for example, the problems that will be worked on, how the group will work together and what the output of the group's work should be. Aim for an introductory presentation that is not more than thirty minutes in length, because people will be eager to get to work. Next, participants take turns introducing the group to their areas of expertise in correlation with the workshop task. During these introductions, attendees briefly describe novel approaches they may have taken that are relevant to the solution work that will be done. Each presentation is about 15-20 minutes.

Although it may require about two hours getting through the attendee introductions, it is time well spent for several reasons. First, it is a way for the group to learn "where individual participants are coming from" in terms of their professional or personal experiences as they relate to the workshop task. Second, it enables participants to learn the skills and knowledge each person contributes to the work they will be doing together. Third, learning about the innovations of attendees will start people thinking about possible solutions.

In the first step, attendees are also asked to share their views on major trends within the field and solutions that could be used in order to solve the problem. In order to stimulate this discussion, we recommend employing a sequence of three thinkLets. The corresponding part of the agenda is depicted below.

Activity within the Workshop	Required Results (Churchill et. al. 2009)	Selected ThinkLet	Time
Presentation of the problem and the desired output	❯ Common understanding of problem and the desired results ❯ Announcement of agenda	No thinkLet defined	09:00
Introduction of participants	❯ Mediation of transactive knowledge	No thinkLet defined	09:30
Lunch			12:00
Discussion on trends in the problem area	❯ Broad base of solutions that are already known	Free Brainstorm	13:00
	❯ To filter relevant solutions in order to solve the problem	FastFocus	14:30
	❯ Generation of additional solutions based on the identified solutions	LeafHopper	15:00
End of the first day			17:00

3/3/2 Decomposing the Overall Task into Sub-Problems

Once the workshop group has a good understanding of the critical technical problems that need to be solved, the next major activity involves breaking down the overall task into more manageable subtasks. Decomposing the problem will make it easier for participants to do detailed solution work. Also, it enables breakout groups to work parallel on different elements of the overall task. The whole group should think together about how to divide the problem area into sub-elements, because everyone will benefit from a discussion of how to do this best. Subdividing the problem is usually done the morning of the second day.

Activity within the Workshop	Required Results (Churchill et. al. 2009)	Selected ThinkLet	Time
Meeting (second day)			09:00
Generation of sub-problems	› Identification of non-overlapping sub-problems to solve the task	Could-Be-Should-Be	09:30
Prioritization of sub-problems	› Ranking of sub-problems according to their importance › Alignment of the group on important problems/ issues	StrawPoll	11:00
Break			11:15
Identification of advanced technologies to solve the sub-problems	› Identification of possible solutions based on the knowledge of the entire group	LeafHopper	11:30
Lunch	Identification		13:00

3/3/3 Generating Ideas for Solutions to Sub-Problems

After the problem has been subdivided, subgroups are formed to begin work on various subelements. The detailed design work and problem-solving is done during this portion of the workshop and usually takes at least a half-day (sometimes longer). Each subgroup contains a mix of lead users, external expert attendees and at least one company representative. In general, external attendees should self-select their subgroups, because they know which group is working on an area that is a good match for their skills. If this causes imbalances, the facilitator can always make suggestions for rearrangements of the groups. The project team members and other company members should be assigned to subgroups according to their areas of expertise. An important role of the company representatives is to provide assistance to the subgroup regarding business interests and solution constraints. Although employees of the company are participating group members, they should avoid dominating the discussion. After all, the point of the workshop is capturing the leading-edge information of lead users and lead use experts.

Thereafter, the developed concepts should be presented visually by each subgroup so that the entire group can clearly see the solutions developed. For example, if the task of the workshop is to develop solutions related to a physical product, the group may decide to draw a sketch or create a simple prototype out of pieces of foam. If solution work has to do with developing specifications for a novel service, these could be represented by a diagram that shows the steps or various components in the process of delivering the service.

Activity within the Workshop	Required Results (Churchill et. al. 2009)	Selected ThinkLet	Time
Formation of subgroups	› Formation of sub-groups according to the abilities and interests of participants	No thinkLet defined	14.30
Generation of solutions to the sub-problems	› Solution Concepts or design patterns in accordance to the sub-problems	No thinkLet defined	15:00
End of the second day			17:00

3/3/4 Refining and Evaluating Solutions

After 2-3 hours of work, the whole group reassembles to build on and improve the solutions developed in the subgroups. This activity starts with subgroups presenting their most promising ideas and unsolved problems. The entire group then works together to further develop and evaluate various solution ideas. In the beginning of the discussion, the facilitator team should provide the group with some criteria by which to evaluate the solutions for suitability. This session will give everyone fresh energy and new ideas. The new ideas may involve changing the way the sub-problems are subdivided, adding new approaches or other matters. The subgroups then take the new information and have another session in which they attempt to further improve the solutions. In the solution refinement segment of the workshop, the group may go through several iterations of improving and evaluating solutions as a whole group, and then spend time completing more detailed refining of them in breakout groups. During this process, it is often wise to periodically exchange the members of subgroups somewhat to avoid locked-in positions as to what the "right" solutions should be.

Activity within the Workshop	_Required Results (Churchill et. al. 2009)_	_Selected ThinkLet_	_Time_
Get together (third day)			_09:00_
Presentation of solutions to the sub-problems	❯ _All participants receive a detailed insight into the partial solutions_	_No thinkLet defined_	_09:30_
Evaluation and annotation of the elaborated solutions	❯ _Ranking of the generated solutions in relation to the pre-defined quality criteria_	_MultiCriteria_	_11:00_
	❯ _Proposals to improve the partial solutions_	_LeafHopper_	_11:30_
Lunch			_13:00_

3/3/5 Combining and Finalizing Solutions

The goal in this final segment is to arrive at one integrated solution or several solutions. First, the entire group evaluates solutions that were developed during the previous refinement activities based on agreed upon criteria. The strongest features of various solutions are then combined into a final "best" solution or several alternative solutions. This final segment may also involve several iterations of combining and evaluating solutions as an entire group, and then refining the solutions again in sub-groups.

The finalized concepts should pass this test: 1) they are leading edge approaches to the design problems worked on and 2) they fit within the economic and technical constraints that were presented to the group. Before the conclusion of the workshop, the facilitator should make sure that the best concepts are clearly portrayed in words and sketches or diagrams. The group's evaluation of the finalized concepts should also be well-documented on flip charts or in the notes of team members.

Activity within the Workshop	Required Results (Churchill et. al. 2009)	Selected ThinkLet	Time
Final evaluation of solution concepts	❯ ranking of all solutions for a sub-problem	MultiCriteria	16:00
	❯ consensus on the best approach	Red-Light-Green-Light	16:30
Combination of partial solutions	❯ Linking the best solutions to an overall concept ❯ Assess the final concept with the help of a business canvas	No thinkLet defined	17:30
End of the third day			18:30

4

STEP FOUR: *COMPLETING THE PROJECT*

After the workshop, teams go through a process of refining their preliminary product or service concepts in light of what was learned from lead users and experts in the workshop. The finalized concepts are then presented to management. During this meeting, all key people should be present who will be responsible for testing the concepts and moving them through the next commercialization steps.

Teams carefully orchestrate the meeting with management. The goal is to make the presentation compelling and concise. What managers usually want to understand is what the proposed products or services will do, the design principles behind them and why customers would be willing to pay for them. Teams also come prepared with solid evidence that the concepts offer unique benefits to consumers, namely ones that are truly different from those offered by competitors.

Generally, the novel functions and benefits offered by "breakthrough" new products and services are difficult to evaluate by means of quantitative methods that are very useful for evaluating more routine concepts. For this reason, in many lead user projects, managers evaluate concepts using their own judgment combined with testing the concepts with a small group of users in the targeted markets. The team should expect that some adjustments will have to be made to the solution concepts developed in the workshop in order to better fulfil the requirements of the project. Adjustments are usually necessary due to the fact that lead users and lead user experts have observed future product or service needs that routine users have not yet experienced. As a result, the team's target customers may not see the value in some attributes that lead users and lead use experts at the workshop judged as important, even though the target customers may want these attributes in the future.

Nevertheless, the project team should be conservative about making adjustments to the concepts developed in lead user workshops. Some or all team members may have devoted years to studying their target market. It is, therefore, possible to lose some of the benefits from the insights of lead users and lead use experts if the team is too energetic about "improving" the workshop concept until it fits members' own views of what targeted customers want.

Once the concepts have been finalized, lead user project teams typically put together a new product or service proposal, which is presented to the management group overseeing the project. Every company has its own unique requirements regarding the nature of the content that should be included in new product or service proposals. Therefore, we will not attempt to provide specific advice to teams on this matter.

FURTHER READING

Leimeister, J. M. (2012):

Dienstleistungsengineering und –management; Springer Berlin Heidelberg; ISBN: 978-3-642-27982-9, doi: 10.1007/978-3-642-27983-6. Year: 2012.

Background Information

Essential to the successful development of services is that they are underlined by a reasonable service process and design. Service Engineering is defined as the systematic design and development of services by deploying engineering methods, practices, and tools.
Developing and marketing services hence is a crucial success factor for most enterprises in recent times. In order to leverage these opportunities, competences in service engineering and management become inevitable. This book covers fundamentals, central processes and methods as well as examples of usage for systematic design and development of new (IT-based) service offerings (service engineering) as well as their management and provision (service management).

Further Information: www.dienstleistungsengineering.de

Leimeister, J. M. (2013):

Collaboration Engineering; Springer Berlin Heidelberg; (to appear)

Background Information

Collaboration Engineering aims at designing and deploying collaboration processes for high-value recurring tasks such that practitioners can execute these processes successfully without the intervention of professional facilitators. We outline the foundations of Collaboration Engineering and present the Collaboration Engineering process, the Six Layers of Collaboration Engineering and the Collaboration Process Design Approach as tools to design for effective group work.

Once the concepts have been finalized, lead user project teams typically put together a new product or service proposal, which is presented to the management group overseeing the project. Every company has its own unique requirements regarding the nature of the content that should be included in new product or service proposals. Therefore, we will not attempt to provide specific advice to teams on this matter.

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