Integrating 'Lead Users' into a Firm's Innovation Systems

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The Smeal College of Business at Penn State
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1. Introduction[1]. Truly novel ideas and concepts constitute the first step towards radically new products or services (e.g., Cooper and Kleinschmidt, 1994). Research on the sources of innovation shows that, in particular, so-called 'lead users' within the customer community are capable of coming up with new product concepts that are both truly novel and of value to the market as a whole in the future (e.g., von Hippel, 1986; Urban and von Hippel, 1988; Morrison, et al. 2000; Franke, et al. 2006). It has further been suggested that lead users from advanced analog fields may be the most likely sources of the most radical and potentially profitable new ideas (Lilien, et al. 2002; von Hippel, 2005; Franke and Pötz, 2006; Hienerth, Pötz, and von Hippel, 2007). Empirical research on the value of lead user generated ideas, both in the target and in analogous markets, shows that they are considerably better rated regarding novelty, originality, market share and strategic importance than concepts generated with traditional idea generation techniques (Lilien, et al. 2002). Lead user concepts may provide, on average, over eight times higher sales potential than traditional products and are more likely to be considered as breakthroughs. With the "lead user method", companies can systematically generate new product concepts of such high potential (von Hippel, 2005). The method has already proved its value to companies such as 3M, Nortel, J&J and Hilti (Herstatt and von Hippel, 1992; von Hippel, Thomke, and Sonnak, 1999; Gruner and Homurg, 2000; Olson and Bakke, 2001; Herstatt, Lüthje, and Lettl 2002).

In contrast, other researchers (e.g. Christensen, 2003) indicate that listening to existing customers is unlikely to produce radical innovations; indeed such actions may actually be counter-productive as attachment to existing products or services may hinder rather than enhance innovation. However, research on innovation from 'lead users' shows that this specific *sub-class* of customers may be a source of radical innovation. Further, results that show that inputs from "analogous" markets are more likely to produce valuable innovations than for current markets may indeed be supportive of Christensen's arguments as these groups are further from the day-to-day user experiences that may inhibit radical innovation.

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[1] The author recently spent 4 months at the Centre for Entrepreneurship and Innovation, University of Economics and Business Administration, Vienna. These notes were prepared from numerous discussions and documents graciously provided by members of the group: Prof. Nikolaus Franke, Mag. Rudolf Dömötör, Mag. Peter Keinz, Mag. Katharina Klausberger, Mag. Stefan Oberhauser, Mag. Marion Pötz, Dr. Reinhard.Prügl, Dr. Martin Schreier, and Mag. Christoph Steger. Acknowledgement is also due to the group's research collaborators, Prof. Eric von Hippel, MIT Sloan School of Management, Prof. Karim Lakhani, Harvard Business School, and Dr. Christoph Hienerth, Copenhagen Business School. The research within the centre is focused on ways that firms can tap the intellectual capacity of external problem solvers, both individuals and communities; specifically how they can find them, manage them, help them, sustain them, and adopt their innovation outputs. These notes discuss the current work of the group and its potential impact on existing enterprises.

As discussed in a recent white paper from the Farrell Center[2], the Internet has migrated from a static medium into a dynamic cooperative tool (generally referred to as Web-2.0) in which communities or social groups can form and interact. Enterprises are now experimenting with the use of the Internet for collaborative innovation including the involvement of 'lead user' innovation communities. In so doing, several major issues are being uncovered. For example, how can the best lead users be identified, engaged and their interest sustained, what tools and information should an enterprise provide to aid and encourage the best lead user innovators, how can a large number of ideas be effectively filtered for quality and appropriateness and incorporated into the enterprise?

2. Identifying Lead Users. In spite of the seemingly enormous potential, efficiently finding and integrating the "right" lead users is a complex process. Current research suggests several techniques such as **screening, pyramiding, broadcasting, and content analysis** (e.g., von Hippel, 2005).

- **Screening** the population of existing users for lead user characteristics is one possible way but can only be applied economically for small populations and is restricted to a search within the boundaries of an existing population.
- **Pyramiding** is a technique whereby referrals create a network by referring someone above themselves in appropriateness. In a recent study Prügl (2006) compared the efficiency of screening and pyramiding and showed that pyramiding outperforms screening for the purpose of lead user search. Typically just three referral levels can generate a powerful innovation network. To avoid a tendency to a uniform view, it is recommended that several independent initial referrers are stimulated. During a pyramiding search process it is also likely that lead users in the target market may refer to relevant 'analogous' markets in which past struggles with a specific problem might have already have forced exploration outside existing boundaries to find a solution (von Hippel, 2005). Pyramiding can also tap 'transactive memory' whereby knowledge of earlier contacts or networks is invoked to extend the network – initial contacts need not have the information or experience desired for input, merely that they can point to the appropriate resources, (Wegner, 1986, Kotlarsky and Oshri, 2005).
- **Broadcasting** the target problem to an online community in order to contact successful problem solvers is a recent approach for finding lead users, (Lakhani, 2006). The method can be refined by publicizing unresolved issues or requests for improvement e.g. in internet forums, while appealing to lead users' intrinsic motivations and/or offering to them extrinsic incentives for useful solution contributions. For example an 'idea competition' can improve the number and quality of problem solvers (Piller and Walcher, 2006; Toubia 2005). According to Lakhani (2006) broadcasting search processes also attract problem solvers from the periphery thus indicating that the method also provides the possibility of finding lead users from analogous markets. As yet there is little data available on this technique's successes; nevertheless the internet in general and broadcasting in

[2] "Business Process and Model Innovations Involving Open Innovation, Threats or Opportunities". Available at www.smeal.psu.edu/fcfe

online communities in particular offer tremendous potential for the efficient identification of lead users and this is a rich area for continuing research.

- **Content Analysis**. As the internet and its existing online communities and platforms already offer a huge amount of posted content, it is likely that accessible innovative ideas and solutions already exist without the need to broadcast. This suggests that a suitable search and analysis process might be more effective than broadcasting to identify lead users, both in the target and in analogous markets. This technique is an ongoing research topic. The analogous market areas are receiving particular attention as existing research shows that lead users from advanced analog fields may be the better sources for the most radical and potentially profitable new ideas.
- **Screening** of ideas from on-line communities can present major challenges – the shear volume of ideas and their variable quality can call on significant resources. Research is proceeding to determine whether the community itself can effectively act as an idea filter using peer voting and comment techniques. Peer evaluations are compared with "expert" judging to determine whether such scalable methods are reliable and, if so, how best to provide the tools for effective peer evaluation.

3. Supporting Online Innovation Communities - Tool-Kits. This term is used for support frameworks enabling third parties to engage with firms in such tasks as product conceptualization and design, problem-solving, and innovation. Note that tool-kits are concerned with much more complex and open-ended collaboration than the simpler "extended shelf" tools that companies, such as Dell, deploy on their web-sites to help customers choose certain configurations of largely standard products and modules. Tool-kits are used to extend and explore the "solution space" for both customers and providers.

The research in Vienna is looking at how companies can design tool-kits to be more user-friendly and hence more valuable for innovation. Initial findings show that "non-experts" in the field under question generally do not have the "problem-solving" heuristics to feel confident when using such tools. Although they may well have more interesting ideas, not being accustomed to existing design frameworks, they lack the skills to express their ideas with confidence even with the most user-friendly tools. The research shows that these barriers can be reduced by providing more structured information, and bringing experts into the process for helpful feedback during the process.

4. Integrating Lead Users into the Innovation System – The Use of Workshops. Integration of external ideas into the operations of the enterprise can be greatly enhanced using a workshop format in which lead users together with representatives from the company work on the development of innovative new product concepts. Typically a 'lead user workshop' has around 10 to 15 participants with a maximum of one third coming from the company (e.g., Lilien, et al. 2002) and lasts for two to three days, (Hienerth, Pötz and von Hippel, 2007). The research provides empirical insights into which type of lead users contribute best to generation of truly novel concepts at such workshops. They show that, first, lead user workshop participants with direct **user experience** make significantly better contributions than equally qualified individuals without such experience. Second, lead users from **analogous markets** contribute concepts that are

significantly more novel than those contributed by lead users from the target market. The research also showed that the **market distance** between the target market and contributors' prior experience is associated with increased novelty of contributions, whereas **technical distance** has a negative influence on the novelty of concepts contributed.

There also is a large range in the quality of contributions, indicating that the mix of different types of lead users or the tailoring of different types of lead users concerning the output goals might be interesting strategies for companies when integrating lead users in the course of a workshop. Ongoing research is looking at which type of lead users should be integrated into a project and what is the optimal mix of lead users as well as which type of analogous markets should be integrated for the generation of most attractive solutions. Additionally, workshops can be resource intensive and processes for systematic facilitation of lead user interactions are being examined.

5. Firm Performance. The Viennese group is also looking at the impact that involvement of potential customers in product innovation may have on overall firm performance. For example, customers that interact with tool-kits for product customization or innovation are more likely to purchase the resulting products and pay a premium for them. This result has initially been researched in the newspaper market by looking at buying patterns for standard products and for highly segmented offerings. Customers do not see any greater value in market segmented products, such as business or sports newspapers over more general newspapers but were willing to pay significantly more for a newspaper that was customized by the user and for the user. These results suggest new business models for electronic or hybrid print/electronic media.

Such business models may be used to expand on those where mining the so-called 'long-tail' enables customers to uncover specialized products that may fit their needs more closely than purely mass marketed products. Examples such as Amazon for the book market and Netflix in the video rental market come to mind.

The results also suggest innovations for other consumer products. As companies continually segment markets into ever smaller categories in an attempt to gain market share in a commoditized field, consumers suffer from 'the choice paradox'. Greater confusion drives them towards simpler more generic products, thereby entirely negating the segmentation strategy. For example, a potential customer endeavoring to select a digital camera is confronted with up to one hundred different products and models. Perhaps there is an opportunity to use a tool-kit to help a customer configure a camera for his/her particular needs. At the point-of-sale, the camera is automatically programmed to meet the precise needs of the customer.

Or perhaps more radically, the rows upon rows of market segmented shampoos in a store could be reduced to just one dispensing machine, much like the custom paint mixing machines, to make a personalized shampoo at the point-of-sale, reducing inventory, while enhancing the potential to buy that brand and the willingness to pay more for the product.

The supporting tool-kit could be a web-based application which provided the user with a unique code to be typed into the dispenser when at the store.

The research group also discovered that the willingness to purchase, and brand loyalty extends beyond those that participate first-hand with the tool-kits. Just awareness that a company is willing to involve customers in its innovation and product design enhances image and brand loyalty with the non-participants too.

6. Culture Shift. The overall trend to engage with external stakeholders is analogous to a shift from a dictatorial to a democratic political system. In the past, companies have more or less told customers what product or service they should buy, how they can buy it, and how they should use it. The evolution of the web to be interactive rather than passive has shifted the balance of control more to customers, much in the way "people power" is established as oligarchies shift to democracies. Enterprises recognizing the value to be derived from this shift are seeing major benefits; however it does require a fundamental change in corporate culture. P&G is often quoted as the benchmark case for shifting successfully from an internally focused to a community focused innovation culture.

7. Summary. The current research in Vienna is (1) to define and test methods for the identification of lead users both in a target and in analogous markets employing internet technologies and (2) to identify which lead users should be integrated and how they should be engaged to generate the most attractive new product/service concepts. The research has immediate practical applications. For example:

- How to use internet technologies for the efficient identification of the most appropriate lead users both in target and analogous markets.
- How to design cooperation with lead users according to both the enterprise's and customers' needs.
- To enable companies to systematically and efficiently cooperate with lead users in new product/service development thereby reducing the risk of failures, increasing the likelihood of generating breakthroughs, enhancing users' benefits by providing products and services for their needs and thereby increasing customer loyalty, and gross margins on sales.

8. Questions for Discussion.

- Is your company currently using lead user communities for new ideas? And, if so, what difficulties have you experienced?
- What techniques have you used to generate lead user communities? What are your experiences with the techniques described in this paper?
- How do you handle questions concerning intellectual property ownership?
- Have you experimented with automated on-line search and analysis methods?
- How open is your corporate culture to engaging with external innovation communities?
- Can you comment on the apparent conflict between Christensen's view of customers' inputs and the value of lead users?

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