Managing Unsolicited Ideas for R&D

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Existing academic and popular literature suggests that unsolicited ideas, the non-contractual and voluntary submission of innovation-related information from external sources to the firm, offer the promise of a bountiful and low-cost tool to sustain and extend firms' R&D efforts. Yet, in practice, many organizations find it difficult to deal with unsolicited ideas because of high quantity, low quality, and the need to transfer IP ownership. This article identifies a range of practices that allow organizations to meet these challenges and therefore realize some of the potential of unsolicited ideas for R&D. (Keywords: Innovation management, Intellectual property, Technological innovation)

I n recent years, there has been a significant increase in the number of firms attempting to open up their organizational boundaries to improve their use of external sources of innovation. Such "open innovation"[1] engagement has helped firms in finding new and productive combinations of internal and external knowledge, thereby increasing the efficiency and efficacy of their internal R&D efforts.[2] In this context, we focus on how large firms open themselves up to unsolicited ideas, defined as the voluntary submission of innovative ideas by external actors, such as individuals, university researchers, firms, or others that do not fall under a formal collaboration agreement and are thus not directly requested by a focal firm.

A common feature of many industrial sectors,[3] processes set up to encourage external actors to submit unsolicited ideas have long been known as a proficient mode of interaction to increase customer loyalty and brand value. Specifically, by offering consumers the opportunity to submit ideas to an unsolicited idea process (hereafter: UIP), companies may source vital information on consumer preferences

and ideas about, and foster consumer engagement with, their products and services, leading to incremental improvements that increase their value to consumers.[4]

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In addition, recent academic and popular literature suggests a significant potential of UIPs for R&D purposes.[5] Through UIPs, companies are supposed to have the chance to obtain solutions to current R&D problems as well as ideas for new products and services that are non-obvious to internal R&D staff and contain a truly inventive step. However, in practice many firms are struggling to harness UIPs, in particular for R&D purposes. For example, during the recent oil spill in the Gulf of Mexico, BP received over 80,000 ideas from outsiders in less than a month. Although within this set of ideas there were many innovative ones,[6] it was a time-consuming and non-trivial problem for the BP-led team to sort through the useful ideas and separate them from the less useful. Indeed, as a BP spokesperson said: "there hasn't been one that's come from that system that's come all the way." Or, as suggested by one senior officer of the U.S. Coast Guard: "There's so many ideas you become numb to them."[7] Indeed, this example and further anecdotal evidence[8] suggest that firms may sometimes literally feel "flooded" with unsolicited idea submissions and choose to erect "flood defenses"—based on which ideas are (automatically) rejected, archived, and, often, forgotten[9]—and, thus, potentially valuable ideas never make it to their R&D destination.

In this article, we examine the challenges of UIPs and explore the practices firms can apply to counter these difficulties. We conducted a mixed-method study, building on exploratory interviews with a range of firms, an in-depth case study, a web-based review of the approaches to UIPs taken by the world's 200 largest firms, and a set of exemplar case studies showing good practice.

Theoretical and Empirical Background

The Promise of Unsolicited Ideas

Unsolicited ideas represent one specific form of open innovation to acquire new knowledge from outside the firm. Their format may range from e-mail addresses (e.g., AT&T), open textboxes (e.g., Pfizer), or postal mail addresses (e.g., U.S. Postal Service) that externals can use to submit an idea, to more formal idea submission websites (e.g., 3M), to innovation jams and tournaments open to the general public (e.g., Dell IdeaStorm). Some firms have even seen their UIPs rise to public fame, as the introductory BP oil-spill example or Toyota's heavily promoted "Ideas for Good" campaign clearly show.[10]

As these examples indicate, the submission of unsolicited ideas is a common element of innovation management in a wide range of industrial sectors, especially where direct contact with other industry stakeholders such as suppliers, users, final consumers, or university researchers is common.[11] These actors hold two types of knowledge.[12] First, knowledge about their own needs and problems, and firms have

long been known to successfully tap into this knowledge for diverse purpose such as market research or increasing customer loyalty. Second, some externals may also hold knowledge relevant to the problems and needs *of the focal firm*—specifically, knowledge about how to solve problems currently encountered by the firm's R&D team[13] and ideas about truly novel and inventive new products and services that the firm's own R&D team has not yet thought about.[14] This luring promise has led academics, consultants, and even some practitioners to suggest that UIPs may hold great promise in improving the efficiency and effectiveness of firms' R&D efforts.[15] The hope is that informed industry participants will hold a deep understanding of the firm's products and services, including their merits and flaws, and potentially will show how to improve and extend existing and future versions. When they submit unsolicited ideas, these externals might thus submit valuable sticky information.[16] In turn, firms can distil the best ideas from the pool of submitted knowledge to solve current R&D problems and develop new or improved products and services.[17]

Managerial Challenges in the Unsolicited Idea Process

Yet, realizing these ambitions is harder than its first appears. Firms running UIPs face many challenges resulting from the fact that idea inflow in UIPs is essentially unpredictable: unsolicited ideas are of potentially limitless quantity and highly variable quality, rendering the UIP a prime example of the chaotic model of innovative search.[18] In such situations, problems about scarcity of management and specialist attention become particularly pronounced.[19] The quality and quantity of submitted ideas may create burdens as well as opportunities for managers, exacerbated by the role of intellectual property (IP) ownership and protection, two further drivers of cost and effort.

Quality and Quantity

Regarding quality, as already suggested by von Hippel,[20] the average user of a product or service often lacks the expertise required to a make truly insightful, high-quality contribution to a firm's innovative efforts. Unsolicited ideas, by definition, potentially come from everyone outside the firm. As a result, firms may attract many ideas from low-skilled, inexperienced individuals submitting low-value ideas (at least from an R&D perspective).[21] The less expert or lead-user the submitter, the more the firm will need to invest resources and management time to transform their unsolicited idea into a product or service.[22] However, at the same time, a more diverse range of submitters can be a source of more creative ideas, as their thinking may not be constrained by existing categories.[23]

Looking at quantity, as submitters' cost of sending in an idea is usually low, firms may be faced with a high number of submissions, each of which will need to be documented, considered, and judged as to its usefulness to the firm. As Poetz and Schreier speculate, some "firms might simply be confronted with 'too many' ideas . . . and face the problem of not being able to filter and select the most promising ones (or only being able to do so with tremendous effort . . .)."[24] Accordingly, one critical challenge lies in shaping the flow of unsolicited ideas into the innovation process to avoid it being bogged down in idea management, freeing up managerial attention to focus on the most valuable ideas.

IP Protection and Ownership

Beside the problems of receiving too many and/or low-quality ideas, UIPs will bring with them the added challenge for firms in documenting, storing, and managing incoming ideas with regards to IP protection and the transfer of ownership. Fundamentally, to be allowed to exploit external ideas, firms need to receive ownership, or permission to use them through a licensing arrangement.[25]

If submitters hold formal IP, they can transfer ownership to the firm via markets for technology.[26] For example, if they hold a patent, that may facilitate the exchange of ownership by enabling a negotiation process in which negative effects of the paradox of disclosure[27] are minimized. Even here, however, externals may only partially disclose their ideas to large organizations and perhaps withhold critical information about the technical properties of the idea—but such information is crucial to make informed decisions about their value. Negotiations to access this information are often torturous and time-consuming, in particular when externals are wary of intellectual theft or insist on (unrealistically) high valuations of their ideas.[28]

When firms receive not-yet-protected ideas, they need to ensure that these match formal requirements to later attain excludability. For example, publicly revealed ideas cannot qualify for patenting, putting rigorous procedural constraints on organizing the UIP. Moreover, externals will be forced to reveal some information to the focal firm to make valuation at all possible, sometimes without the ability to clearly demarcate and protect their idea, which may evoke images of large companies "stealing" the ideas of externals, as famously described in the film *Flash of Genius*.
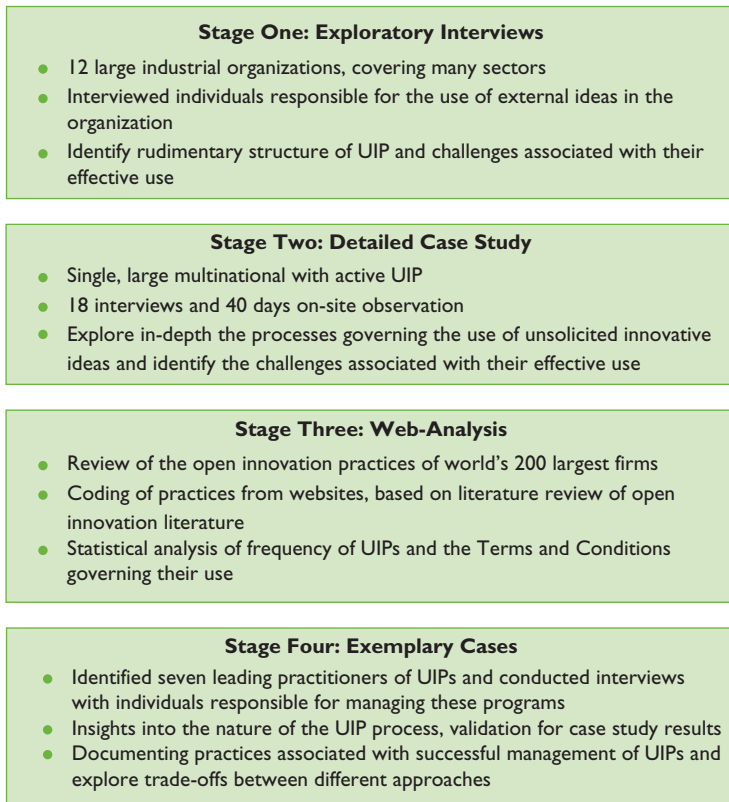
The Practice of Unsolicited Innovative Ideas

With these theoretically unearthed challenges in mind, we look in detail at how firms deal with unsolicited ideas in the context of R&D. Our goal is to understand the specific mechanisms firms have put in place to enable and manage the unsolicited ideas process. From a description of firm practices, we hope to shed light on *the strategies firms can use to increase the impact of UIPs and improve the integration of the knowledge they produce*. Specifically, we analyze: how challenges such as these identified above come into play; and the practices firms can use to increase the effectiveness of their UIPs. In doing so, we seek to provide a roadmap for firms trying to realize the potential of unsolicited ideas in R&D contexts.

Data and Methods

Following recommendations by Edmondson and McManus for how to design research to extend "intermediate theory,"[29] we conducted a mixed-method study using several complementary approaches. Our approach is based on the four elements summarized in Figure 1.

- ▪ *Exploratory Interviews:* We conducted exploratory interviews with 12 large multinational firms in both high-tech (e.g., pharmaceuticals, semiconductors) and low-tech (e.g., construction, consulting) sectors, all of which had significant exposure to unsolicited ideas, to get an overview of the challenges firms are facing. Specifically, we spoke to senior managers

FIGURE 1. Research Methods and Evidence

Stage One: Exploratory Interviews

- 12 large industrial organizations, covering many sectors
- Interviewed individuals responsible for the use of external ideas in the organization
- Identify rudimentary structure of UIP and challenges associated with their effective use

Stage Two: Detailed Case Study

- Single, large multinational with active UIP
- 18 interviews and 40 days on-site observation
- Explore in-depth the processes governing the use of unsolicited innovative ideas and identify the challenges associated with their effective use

Stage Three: Web-Analysis

- Review of the open innovation practices of world's 200 largest firms
- Coding of practices from websites, based on literature review of open innovation literature
- Statistical analysis of frequency of UIPs and the Terms and Conditions governing their use

Stage Four: Exemplary Cases

- Identified seven leading practitioners of UIPs and conducted interviews with individuals responsible for managing these programs
- Insights into the nature of the UIP process, validation for case study results
- Documenting practices associated with successful management of UIPs and explore trade-offs between different approaches

in R&D, external knowledge sourcing, or university relations, most of which were in charge of the corporate attempts to source outside knowledge for R&D, including UIPs. These interviews allowed us to draw up a rough sketch of the UIP as handled by these firms.

- *In-Depth Case Study:* Out of the exploratory interview partners, we selected one multinational to conduct an in-depth case study on its experience with unsolicited ideas.[30] Our case study approach is described below.

- *Web-Analysis of Practices:* To identify solutions to the challenges we found, we carried out a web-based analysis of the publicly accessible UIPs of the top 200 firms in the *Fortune Global 500* (2009) list,[31] for which we follow the approach of Prandelli and colleagues.[32] Using the firms' websites, we sought examples of clearly documented UIPs, the terms and conditions governing them, and relationships between the UIP and other open innovation practices.[33] Thus, the web analysis allows us to draw a picture of what the world's 200 largest firms are doing to attract and manage unsolicited ideas. As a descriptive statistic, it is interesting to note that only 51 firms in our sample had a UIP in place on their websites. Whereas some of these are active in

utilities, retailing, and logistics, showing that UIPs are not a "high-tech only" affair, it seems safe to say that the existence of a UIP correlates positively with the technology-intensity of the industry: very few firms in service-based or low-tech industries have UIPs, whereas highly technology-intensive industries such as pharmaceuticals, computers, or electronics show higher ratios. Nonetheless, exceptions exist of both high-technology industries with little or no UIP engagement (aerospace) as well as supposedly low-technology industries (food consumer products) with above-average ratios.[34]

- **_Exemplar Cases:_** In addition, to understand the rationale for what leading firms in this area were doing, we conducted interviews with seven organizations, analyzing how they had approached the challenges of UIPs and the practices they had implemented to address them. We selected these firms through our web analysis, which provided an opportunity to compare practices for leading firms, also making sure a variety of industries was represented (retailing, electronics, oil and gas, chemicals, motor vehicles, food, and consumer goods). In each case, we spoke with the most senior individual(s) involved in these companies' UIPs. Although we attempted to broaden our research perspective over the stages of the research, two of these firms had already participated in the exploratory interviews (stage one). Consequently, we made sure to speak to different people in these organizations, focusing more directly on the management and organization of their UIP efforts.

Taken together, the variation in firms' industrial backgrounds in the exploratory interviews, web analysis, and the exemplar cases clearly establish the generalizability of our findings.

The Case Study: The Challenges of Unsolicited Ideas

Through our exploratory interviews, we become acutely aware of the challenges faced by firms in managing a UIP. We found that for many organizations, UIPs raised problems of too many ideas, poor quality and fit with the organization, and disputes over ownership of ideas. Several interviewees indicated that their UIP efforts offered little return to R&D and were rather focused on generating positive visibility. Others were more positive and suggested that the value of UIPs critically depended on the practices used to manage them. Our subsequent research was designed to help bring to the surface these problems and practices.

Thus, to further our understanding of the challenges associated with UIPs, we chose from the pool of our exploratory interview partners a multinational, technology-based corporation with a large consumer base for an in-depth case study. This organization was well suited for our research purposes because: unsolicited ideas were common to this firm; a high expected variation in quality of the unsolicited ideas (due to varying levels of relevant expertise possessed by submitters); and the exploratory interviews had indicated that the problems faced by this firm were representative of the experiences communicated to us by all firms in the round of exploratory interviews.

The firm operates in a fast-moving technology environment in which strong IP protection mechanisms are in place. It actively seeks to capture and exploit IP developed internally, externally, and in collaboration between these sources. The organization also actively draws innovations from external sources, with deep and long-standing capabilities in working with users, universities, suppliers, competitors, and other sources on the development of new products and processes. It has also participated in many forms of open innovation (including open source software development, patent donations, and open research calls) and prides itself on its capabilities at engaging in open innovation. This orientation is coupled with a significant internal R&D capability.

Data Collection and Analysis

Through a series of interviews at our case study firm, we covered both the more customer- and the more technology-oriented parts of the firm's R&D efforts, as well as its general UIP and legal setting. Specifically, we spoke to 18 people from various departments and locations whose role involved dealing with external ideas submitted to the firm in various phases of the process. Notably, we spoke to the people in charge of the dedicated UIP the firm has in place, as well as the person in charge of external inventor relations. In addition, we studied several hundred pages of training documents on the handling of (both internally and externally produced) knowledge and ideas. Finally, we spent around 40 days observing employees that were knowledge managers, integrators, and evaluators.

To analyze our data, we used qualitative content analysis.[35] We conducted interviews in a semi-structured fashion, updating our guidelines iteratively and regularly anchored in ongoing findings. Furthermore, we conducted our interviews in waves, selecting new interview partners based on issues that had arisen through previous findings. When we felt that interview results on certain aspects began to converge, we developed narratives for those parts of the company's UIP and discussed these narratives with our research partners.

To code our data, we went through the interviews looking for statements related to challenges of managing unsolicited ideas. From this information, we develop higher-level aggregations of the type of challenges that exist: low quality, high quantity, and legal issues.[36]

Unraveling the Unsolicited Ideas Process in our Case Study Firm

As a focal point of entry for unsolicited ideas, the firm had designed an official, centralized UIP: externals could submit ideas, via e-mail or letter, to a dedicated unit within the IP department. Each year, the firm receives almost a thousand ideas from all around the globe. For about a third of these, minimum quality and legal requirements[37] were fulfilled, and these were entered into an evaluation process. However, the head of the evaluation committee could not remember a single occasion where they had recommended following up on an unsolicited idea to use, license, or acquire it. Overall, and contrary to our expectations going into the analysis, according to our interviewees, no unsolicited idea had gone forward into the standard R&D process of this company.

Quality Issues

All people familiar with the organization's UIP were convinced that the quality of incoming ideas was generally poor. Specifically, this poor quality was measured by a low fit to what the company needed to advance its R&D efforts. They suggested this low quality was rooted in the population of people who submitted unsolicited ideas. Submitters were known to originate from all age groups and backgrounds, and most of the suggestions they made were pure customer feedback with, in almost all cases, little to no value for R&D.

> I have not seen a single one interesting idea, not a single one, because most of [them] are more of a customer feedback.

> [Externals] submit ideas to [firm and similar firms], primarily for ideas which would relate directly to . . . something you can applicably see.

As a result, incoming unsolicited ideas were usually considered uninteresting or already known to R&D—either there was internal research going on about the issue at hand, or, much more likely, a similar idea had been dismissed much earlier.

> I haven't seen a case of anything new coming in from outside that we didn't, sort of, either know of already or it's something that is not relevant anyway.

These results are consistent with von Hippel's[38] observation that the average user is often unlikely to be able to make a significant contribution to larger, more complex innovative efforts at the forefront of R&D. Nonetheless, our findings also reaffirm the value of UIPs for marketing purposes—even those interviewees voicing grave concerns about the value of UIPs for R&D spoke highly of them as an important tool for stakeholder engagement.

Quantity Issues

Similar to the introductory example of BP, our focal firm suffered from a "too-many-ideas" problem: the number of incoming ideas was higher than the threshold of what it could process. However, rather than a decrease in the marginal value of incoming ideas, this seemed to cause a complete shutdown of the process, largely because the value of incoming ideas was perceived as low in general and an emphasis was put on legal matters rather than R&D (see below). Thus, because employees could not see how they could potentially find the one needle in the enormous haystack of unsolicited ideas, they focused on minimizing the cost of handling incoming submissions, rather than putting effort into harnessing their potential benefits for R&D:

> This [UIP] is, basically, a thing that nobody wants to take. . . . So, this is just an additional work and we haven't used that for any other purpose.

In the current process design, the over-large pool of low-quality ideas would be put into the firm's evaluation process, which strongly resembled an academic review process, an analogy that was also made in our interviews. However, academic review processes are prone to difficulties in coping with too large a number of low-quality submissions.[39]

IP Issues

IP matters create an additional challenge for managing the UIP, which following Chesbrough we label the "fear of contamination."[40] As stated before, when externals submit ideas, the firm's internal R&D labs will often be working on similar issues, and the firm will turn down the submitted idea accordingly. Yet, once the firm introduces the results of their efforts into the market as a new product or service, the inventor may (wrongly) claim that their idea has been stolen. In this case, the burden of proof lies with the firm, which needs to be able to show that it did not use the unsolicited idea in its development activities. However, this may be difficult to establish in large R&D departments and complex, fast-moving areas of technology. Often, individuals or departments receiving outside ideas may be unaware of all of the firm's R&D efforts, and thus bring in unsolicited ideas that are already in progress within the firm. This would then render the establishment of a comprehensive and convincing "paper trail of novelty" even more complicated, and firms may see the results of their own R&D contaminated by the submission of unsolicited ideas.

Importantly, the fear of contamination fundamentally impacts how UIPs are designed. For our case study firm, it led to a focus on defensive legal matters, rather than on identifying promising ideas.

> The whole idea behind this program has been basically, defensive. . . . I believe that there might have been a case at some point where [the firm] has been asserted or sued by some individual who claims that [the firm] has stolen their idea and this . . . program tries to cope with such a threat should that ever happen to us again.

Managing Unsolicited Ideas

Our case study has shown that the problems of low quality, high quantity, and IP clearly exist for unsolicited ideas. We now turn our attention to how firms can meet these challenges, drawing on our seven case studies of exemplar practices and our web analysis. To present these remedies, we adopt a process view of the UIP (see Figure 2), breaking them up into an outwards and inwards phase. For each phase, we identify sets of practices that firms have successfully implemented to increase the R&D efficacy of their UIPs, as well as trade-offs between them (see Table 1). For the outwards phase, we distinguish *drawing external ideas*, *shaping external ideas*, and *facilitating transfer*. For the inwards phase, we identify practices around *selecting ideas* and *process management*. This process view and its individual phases emerged from our interviews with firms successfully operating a UIP (stage four); both are further substantiated by the results of the exploratory interviews and the in-depth case study.

Drawing External Ideas

Firms' attempts to draw externals to submit ideas to them are incorporated in the outward-facing design of the UIP. The first important design choice for the organization is how visible to make its UIP program. Some firms have adopted a high-profile, welcoming approach to unsolicited ideas, featuring the UIP on their main corporate webpage and highlighting it in their marketing and media activities. For example, a consumer-goods company told us:

FIGURE 2. A Process Model for Unsolicited Idea Management
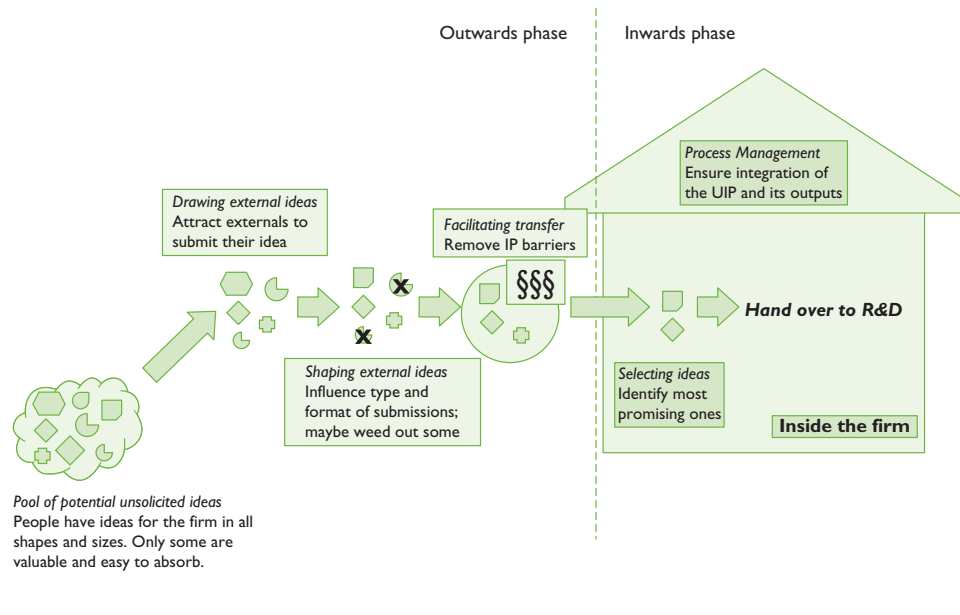
We have brands that are very well-known. We have businesses that are very well known. They interact with people. This is a [consumer-goods] business . . . We are not behind the scenes. We provide products that people work with and interact with on a daily basis. So, they know our products. They know the kinds of things we do. So, I think that might be an advantage as compared to working in a more esoteric or very technical area that people aren't familiar with.

Such approaches create opportunities to engage various external parties, helping to increase the potential for receiving truly novel solutions. However, with high visibility comes high numbers, and, in turn, the danger of being flooded with many low-quality ideas. Accordingly, we found that some firms, mainly those with a business-to-business focus, purposefully decided to *decrease* the visibility of their UIP to the general public because they expected them to lack the knowledge necessary to make valuable R&D contributions. For example, one company admitted they had hidden away the UIP in their website, "so you have to know it's there, or you have to get lucky with your search." Such lowered visibility may allow firms to target specific audiences such as venture capitalists, academics, or technology networks to attract fewer but better ideas:

We want to involve the right people. It is a transfer function, and we control the input, so if we invite universities and inventors that are likely to submit high-quality ideas, it makes for a more efficient process. But if we put an advertisement in a newspaper or something, we might get more ideas, but it might cause a much more inefficient process, where we have more ideas that we aren't able to pursue.

TABLE 1. Collection of Practices and Their Associated Trade-Offs *(continued on next page)*

Process Step	Practices	Benefits	Trade-Offs Potential Risks
Drawing UIs	▪ Increase visibility of UIs web-portal ▪ Establish a clear reward policy for submitters ▪ Explain timing and phases of evaluations process ▪ Use of non-technical language	▪ Attract higher number of UIs ▪ Chance for greater novelty and variety ▪ Build a sense of community around the firm ▪ Align corporate open innovation strategy and treatment of external ideas	▪ Attract ideas of low quality ▪ Might require high resource commitment for UIP ▪ Inexperienced submitters (e.g., incorrect expectations, no IP knowledge) ▪ Might provide strategic information to competitors
Shaping UIs	▪ Share information on R&D activities and objectives ▪ Restrict who is allowed to submit ideas ▪ List pre-defined topics ▪ Broadcast specific needs (via UIP portal and/or technology brokers) ▪ Impose specific submission format	▪ Increase quality of UIs ▪ Speed up and simplify inbound selection and management of UIs ▪ Increase fit of UIs to company needs ▪ Target subject-matter experts ▪ Engage with communities working on common challenges	▪ Leave little room for serendipity ▪ Release strategic information to competitors ▪ Increase danger of contamination of R&D by using unspecific signals
Transferring UIs	▪ Design specific terms and conditions ▪ Be explicit about transfer of ownership ▪ Require ownership of IP ▪ Mandate submission of only non-confidential information	▪ Mitigate threat of contamination ▪ Increase quality of UIs ▪ Enable markets for technology ▪ Facilitate IP-awareness among submitters	▪ Miss out on unpatented inventions ▪ Scare off potential submitters ▪ Impose 'one-size-fits-all' approach on UIs

TABLE I. Collection of Practices and Their Associated Trade-Offs (*continued from previous page*)

Process Step	Practices	Benefits	Trade-Offs Potential Risks
Selecting UIs	▪ Undertake initial filtering of ideas by dedicated teams ▪ Set up advanced evaluation practices (e.g., idea tournament, prediction markets) ▪ Involve submitters and/or external communities in evaluating UIs	▪ Reduce time and resources burden for internal technical experts ▪ Facilitate internal acceptance of UIs ▪ Increase external community buy-in and support	▪ Lack of internal competency for evaluation ▪ "The crowd is not always wise" ▪ Tendency to converge on incremental ideas/solutions
Managing the UIP	▪ Ensure clarity about process ownership (for UIP as a whole) ▪ Encourage cross-departmental involvement (especially legal and IP department) ▪ Find internal champions for UIs ▪ Establish clear ownership of and responsibility for UIs over their entire life cycle	▪ Ensure effective integration of UIPs into R&D activities and processes ▪ Enthuse different parts of the organization about UIs and the UIP	▪ Resource-intensive ▪ High danger of Not-Invented-Here syndrome ▪ Increase complexity and transaction costs

UI: Unsolicited Idea; UIP: Unsolicited Idea Process.

In our web analysis, we further explored this question by assessing the distance between the UIP webpage and the corporate page, finding that it is, on average, three clicks away.

Second, the tone of the UIP and the documents surrounding them will have a significant impact on who might eventually submit their idea to the firm. Open, easy-to-understand, and friendly language will appeal more to the general public; technical language, especially when supported by legal statements, will favor subject matter experts, experienced inventors, and commercial firms. For example, submitters to Kraft's "Innovate with Kraft" web-portal are welcomed by a message from the Executive Vice President of R&D, signaling the importance of the UIP. Furthermore, Kraft avoids the use of jargon, and encourages submissions to broad categories of ideas (e.g., "new products," "packages," and "business processes"). A positive tone may be reinforced by firms offering rewards to idea submitters. Notably, financial rewards are explicitly mentioned by a third of firms in our web analysis. These firms often target professional inventors who expect to be paid for their submissions, suggesting that most firms are trying to tailor their rewards to the idea submitters, such as at General Mills:

> We look at what's motivating the particular solution provider. What's the best fit for them? For some people, that's a financial gain. For other people, it could be help with some other part of their business in addition to financial gain.

Third, firms can be open about the process that unsolicited ideas will undergo *after* they have been submitted, by for example providing case histories of unsolicited ideas taken up by the firm. This may encourage externals to submit ideas of a certain type, format, or quality level, but it will also show that their ideas are welcome and treated fairly and professionally. Examples of products developed in collaboration with external inventors can be found on "Statoil Innovate" and on P&G's UIP web-portal. Similarly, firms might opt for explaining in detail the evaluation process for ideas, including information about when inventors should expect to hear about the outcome of their submission. This practice should further increase submitters' confidence that the company will take their idea seriously. For example, GSK[41] and Ford[42] specify all the steps that unsolicited ideas go through, including the departments involved and expected timelines.

In sum, organizations that offer visible, friendly, and expedited UIPs are likely to receive (definitely) more and (potentially) better ideas than those organizations whose UIPs are obscure, incoherent, or slow. In this sense, it is important that organizations seeking innovative ideas match their words to their deeds, creating systems that inform, engage, and reward submitters for their efforts. However, if firms are concerned about the number and quality of submissions, they may choose to hide their UIP portals, to lower the burden of receiving many low-quality submissions at the cost of lower variety.

Shaping External Ideas

After firms have managed to draw externals toward their UIP, they may choose to shape the externals' ideas so that whatever they submit fits the firms'

needs better and is as easy to integrate into the organization as possible. To do so, firms may share non-critical information about what is currently going on in their R&D departments with the external environment. Such signaling reduces the information asymmetry between the firm and potential submitters by letting the outside world know which ideas would be considered valuable when submitted. For example, sharing current areas of interest or information about the firm's R&D roadmaps may attract others to develop missing pieces, or to come up with complements to the firm's R&D efforts.[43] Indeed, our web analysis showed that more than 80% of firms state on their website the goals of their R&D efforts and list related projects. Almost two-thirds of firms have regular news updates from their R&D labs, and others engaged in scientific or defensive publication even share their R&D outputs with the academic community or the general public. For example, Microsoft has recently made available software related to its Kinect controlling system to explicitly encourage externals (such as university researchers and consumers) to come up with new uses for the device not foreseen by Microsoft engineers.

The degree to which firms communicate what they are working on is again related to their public visibility. Business-to-business firms seemed particularly willing to share information about themselves to direct externals toward areas they were interested in:

> Because we are a . . . supplier, many of the products that we make and sell for the [industry] are not branded [and] people don't necessarily know what we're interested in. . . . Sometimes, inventors and universities have been clear with us that it was very important for us to share those areas of technology because they were unaware of our involvement in that technology.

Of course, the advantages of signaling need to be weighed against its potential costs. In competitive markets, signals may provide valuable information to competitors and potentially increase the threat of contamination if not chosen carefully. Thus, critical attention needs to be given to the form, content, and timing of any information release:

> We think about it in terms of trying to share enough so that people know what we are looking for, but not so much that we are giving away our strategy. What we tell people is not what we are working on; it is areas we see opportunity, and they tend to be framed around academic topics. . . . They are all things that our competition is aware of, and so there is a lot of detail behind specifically what we are doing in the area . . . that we do not share. . . . It does not feel like a risk.

Second, firms may try shaping external ideas by putting explicit restrictions on who is allowed to submit, what sort of idea will be considered, and in what format it has to be presented. These restrictions could be based on the idea itself (e.g., technology base, potential applications), the person submitting (e.g., inventor, university researcher, or consumer), or facilitators of an easy transfer of the idea to the corporation (e.g., existence of a patent, existence of a prototype). Yet, our interviewees had mixed views about such systems. For some, the restriction of submissions was seen to be an essential component of ensuring high-quality

submissions, for example, because submitters might otherwise fail to adequately document IP underpinning their idea. As one firm commented:

> We only accept ideas for which there had been a patent granted or applied for . . . part of it is to hopefully get better quality ideas because, you know, these people have invested time and money in protecting it.

Other organizations argued that such restrictions limited the potential for receiving ideas from unexpected places. In this sense, they were willing to carry the burden of receiving a high quantity of submissions not to erroneously filter out any one good idea. Moreover, they also saw learning opportunities even from eventually rejected submissions:

> We do not know what we do not know. So we would like to welcome those innovations [which could easily have been filtered out] as well. That may trigger some new business opportunities, or new thinking. . . . Even though 90% of [submitted ideas] may be junk, but that's the cost of doing business. If we want external parties to submit their ideas to us [instead of other firms], we need to invest our time in this screening effort. We do not want to miss any golden nuggets in the pile of dirt.

However, these firms, too, agreed that they should mandate invention submitters to follow certain guidelines, or complete pre-defined templates when submitting their ideas, to reduce the cost of evaluation and reduce risk related to IP.

Our web analysis reveals a broad range of approaches used to shape incoming ideas (see Table 2). Most firms (88%) have set up competitions or open calls on pre-defined topics, often targeting universities or subject-matter experts and signaling to them current research areas and problems. For example, Cisco's Requests-for-Proposals[44] scheme sponsors collaborative activities between its engineers and the academic community, both on pre-defined topics and other non-specified areas. Furthermore, our web analysis shows that two-thirds of firms with a UIP ensure that unsolicited ideas arrive in a format that they can easily process by forcing ideas into a specific layout, guiding respondents through a list of questions and imposing a format on each answer given. In addition, more than 47% of firms in the web analysis broadcast specific individual problems[45] for which they seek solutions from externals (LG, for example).[46]

TABLE 2. Use of Practices Shaping External Ideas (n=51)[*]

Practices	Count	Percentage
Naming of R&D Project, Goals, or Targets	42	82.3%
R&D News	36	70.6%
Defensive or Scientific Publication	32	62.7%
Early Prototyping	11	21.6%
Competition and Open Call	45	88.2%
Specific Layout Idea Submission	34	66.7%
Pre-Defined Topics	16	31.4%
Broadcasting Specific Problems	24	47.1%

*These are the firms among the *Fortune 200* companies with a UIP web-portal.

Although broadcasting given technical challenges can increase the quality of submissions and their fit to the company's needs, some organizations believed that encouraging truly unsolicited idea submissions should not be abandoned. As pointed out by a manager of Connected Innovation at General Mills

> If you tell people what you're looking for, it's much easier for them to create solutions for you. So, when those ideas come in, they're ideas that we can act upon and be successful with. Now, we still do want to leave open the room for serendipity. Sometimes a really big idea comes not from our published needs but from serendipity, for example, through the UIP portal or a personal connection or a supplier visit.

Moreover, we found that almost one third of firms in our web analysis explicitly restricted the areas for which they accept unsolicited ideas. For example, Johnson & Johnson[47] lists specific preferred targets for submission such as "mucoadhesive formulations" and "oral compounds for acne rosacea."

Accordingly, we see that firms resort to shaping to lessen the number of low-quality submissions, reducing the burden on companies' idea filters. In addition, by providing internal information to idea submitters or making them follow certain procedures, firms can ensure that incoming ideas are of higher fit to their R&D needs and easier to absorb. However, at the same time, "too much" shaping may lead to companies missing out on the most valuable ideas, and if shaping is "too vague," it may lead to valuable information leaking to competitors, or an increased risk of contamination.

Facilitating the Transfer of Ideas to the Firm

To be able to use any submitted idea, the organization will need to ensure that it receives access or ownership rights. The key mechanism to enable this transfer is the use of terms and conditions (T&Cs) for submitters (see Table 3).

Our web-analysis revealed that most firms with a UIP (88%) have devised additional T&Cs specific to this process to counter idiosyncratic IP issues—the remainder relies on their websites' standard T&Cs. However, just above 56% of firms explicitly ask submitters to agree to specific IP T&Cs on registration or when submitting an idea, indicating that, in a majority of cases, T&Cs are put to one side in the submission process. Indeed, for three firms, we could not even find the T&Cs from the UIP website; for the remaining firms, they were an average of 1.5 clicks away from the submission page.

Looking at the content of the T&Cs, to counter submitters' fears of their ideas being stolen, a majority of firms (55%) do not mandate an automatic transfer of ownership or license grant. At the other extreme, some firms, such as Dell, not only required an automatic transfer of ownership for the submitted idea, but also the option to buy any related IP for a fixed discretionary fee. Regarding the presence of IP rights, many firms (43%) included clauses in their T&Cs requiring that idea submitters have a patent or patent application to simultaneously address the threat of contamination and ease the transfer of ideas:

> If somebody comes to us with an opportunity that hasn't been patented or protected, there is a chance that one [of the firm's several thousand employees] is

TABLE 3. Use of Practices Facilitating the Transfer of Ideas (n=51)[*]

		Count	Percentage
T&C Specific to UIP		45	88.2%
Patent Required on Submission		22	43.1%
Signature Required on Submission		10	19.6%
Non-Confidentiality		37	72.5%
Transfer Type	Not mentioned	29	56.9%
	License	18	35.3%
	Ownership	3	5.9%
	Joint	1	2.0%
License Terms (transfer type "License")	Transferable	10	19.6%
	Perpetual/Irrevocable	13	25.5%
	Worldwide	9	17.6%
	Fully Paid/Royalty Free	12	23.5%
	Non-Exclusive	10	19.6%
Rights Granted on Transfer	Use	29	56.9%
	Modify	23	45.1%
	Sell	18	35.3%
	Sub-License	19	37.3%

*These are the firms among the Fortune 200 companies with a UIP web-portal.

working in that area already. . . . It makes it difficult for the [external] coming to us and us talking to them. Further down the line, if it doesn't make it into a product, it becomes a bit of a slugging match.

Most of the remaining firms strongly encouraged idea submitters to consider obtaining some form of IP protection. Indeed, in one company we interviewed, which did not formally require a patent, submitters that were unable to identify clear ownership of their idea still found their ideas rejected. Also, this firm would only accept non-confidential information from submitters. In some cases, they were willing to enter into further discussion with submitters if they had a viable, on-going business based around the idea, even if they possessed no formal IP. This approach helped ensure that potential pathways existed to build upon even unprotected ideas, while minimizing the threat of contamination. However, these situations were small in number and, in most cases, without clearly demarcated ownership, ideas were immediately rejected. In addition, this firm and others regarded IP rights as indicator of quality, and a facilitator for the exchange of knowledge assets on markets for technologies:

We have come to the point where we have said if you haven't actually patented something, we don't want to know. Chances are, it's at such an early stage, the risk associated with ploughing resources into developing it with somebody, it's not going to be worth it. It should be at least patented, that avoids any complications over ownership and you can license something properly.

Taken together, the challenge for organizations resides in being upfront and clear to potential submitters about the IP-related T&Cs. Such efforts need to be carefully balanced. Aggressive, forthright T&Cs may scare off potential submitters,

while ambiguous T&Cs may sow confusion in later stages of the relationship. From the interviews, it was clear that many idea submitters had not carefully read the T&Cs before submitting, an issue which firms need to address in managing external inventors. Finally, imposing a requirement to hold formal IP may help increase the quality of incoming ideas and facilitate their eventual transfer to the firm, but it also closes off potentially valuable ideas that do not meet the formal requirements of the patent system. For example, when General Mills first launched its UIP web-portal, it mandated submitters to own formal IP. However, in an effort to increase the initiative's benefit to R&D, it recently decided to remove this requirement, resulting in a five-fold increase in submissions.

Selecting External Ideas

Faced with the pool of submitted ideas, firms need to efficiently and effectively select those they consider valuable, which, as evidenced by the case study, is associated with a considerable resource burden. As shown above, one way to make selection easier is by proactively shaping the flow of incoming ideas. However, this may risk throwing out the baby with the bathwater—after all, UIPs should bring in truly novel solutions from the outside. Thus, firms will need to find an appropriate balance between lowering the resource burden through shaping and being open to finding novel ideas through a costly selection process, depending on their needs.

A potential solution to this dilemma is expanding the task of filtering beyond the UIP itself, to include other parts of the organization or even the submitters themselves. First, firms may decide to only do a very rough selection in the UIP and forward a multitude of ideas for further evaluation "inside the firm"—for example, in innovation tournaments,[48] ideas compete against each other over several rounds until a reduction in the number has been achieved that allows further processing. Similarly, prediction or preference markets enable employees or other stakeholders to express their beliefs about the future value of an opportunity by trading artificial stock on different ideas.[49] Alternatively, one of the firms that we had spoken to had adopted a two-step evaluation process. In the first step, internal experts were simply asked whether or not they found an idea interesting enough to be followed up. Only for those ideas where interest was expressed, additional information was requested from the inventor and more detailed evaluations were conducted afterwards.

Moreover, approaches exist where the idea submitters themselves, as a community, may vote about the value of an idea, which may also indicate their willingness to subsequently purchase this idea as a product or service. From a resource-burden perspective, externals take over for free a large share of the innovation process including idea design and selection, thereby saving the firm a considerable amount of management and specialist attention.[50] This approach is exemplified by Cisco's "Idea Market" system for its I-Prize competition[51]—which allows participants to buy and sell ideas on an open market, establishing in this way a value for each submission—as well as Best Buy's "Ideax" web-portal—where submitters are invited to vote for good ideas.[52] However, some firms reported problems with community voting, potentially leading to convergence towards compromise solutions or, worse, communities rigging or hijacking voting procedures to promote "fun outcomes" of little value to firms.

Process Management

To successfully harness the R&D power of their UIP, firms have to invest in building inward-facing practices to foster the exploitation of unsolicited ideas. Since even good ideas often face significant resistance within organizations,[53] the critical issue is to develop mechanisms that embed the UIP in the wider organization. Such efforts should pay careful attention to the organizational design and ownership of the UIP itself and to the practices put in place to help ensure that promising ideas are subsequently adopted by the firm.

Regarding organizational design, two important and interdependent decisions need to be made. First, should UIPs be controlled centrally, or should decisions about whether and how to run a UIP be assigned to individual departments or business units? While a centralized process may allow for greater efficiency by channeling all ideas through the same process, in doing so, the firm may lose its ability to treat groups of idea submitters differently. This variance may even be compounded for multi-product firms working in unrelated markets. As an interesting approach to this problem, one firm relying on a central UIP presented to us a "red carpet" approach: if they identified, in their pool of submitters, someone who was very likely to be submitting a good idea (a famous professor, known expert, or someone who had submitted a good idea before), they would take this person out of the normal UIP and give him or her preferential treatment. However, firms repeatedly suggested to us that practice had taught them that a centrally organized UIP that maintains close ties to its internal customers in R&D and other departments was the most effective and efficient organizational arrangement.

The second important design question is "Who owns the process?"—R&D, legal, or another function? In the case study, we have seen that the affiliation of the UIP with the legal department created seemingly insurmountable barriers against its R&D impact. Another interviewee stated:

> An IP attorney tends to be something like "protect the company intellectual property" and "protect the company from unnecessary external legal battles" . . . that tends to be their mindset. But that mindset is very different from "I would like to partner with external parties," "I would like to create a situation for them to openly and willingly bring their innovations for our consideration."

However, even if IP holds no process ownership over the UIP, their involvement will *always* be required when in negotiations about IP. It is thus important that IP departments learn to become facilitators of idea transfer rather than simply protectors of the corporate realm.[54] One advantage for significant involvement of IP in the process is that it limits the danger of contamination. Moreover, R&D staff may pay too little attention to IP. This suggests that whether the management of the process is assigned to IP or to R&D is not the most important question, it is rather the degree of cross-departmental exchange and the development of common approaches. An integrated, cross-departmental approach to the UIP will help to ensure that IP issues do not preclude exchanges with potential submitters, and that R&D employees are well-supported in signaling needs to potential submitters and transferring ideas into the firm.

Accordingly, many firms have opted to create a separate function focusing specifically on interaction with external inventors, which would then also be put in charge of the UIP. While certainly the most resource-intensive option, this approach holds the advantage of creating a broker between IP, R&D, and external inventors who is well-versed in the internal workings of the company and well-connected to the population of potential idea submitters. As described by one firm that had created a dedicated department to centrally handle the UIP:

> Different organizations [R&D, IP] are treating external parties differently. The speed of the response is different. The way we are treating these external submissions is different. . . . So there was a completely fragmented way of treating all these. So the first step we did was we created a tracking system for us, so that everything comes to one central location. I think, efficiency-wise, that's the best thing to be done, and that's what we have implemented.

Naturally, this leads to the question of the integration of the UIP in the larger organization: how can selected ideas be handed over to R&D successfully? First, we found that there is a considerable level of effort required to find an internal customer for external ideas. Where there are dedicated UIP teams, they often acted as matchmakers, linking idea submitters to interested internal customers. Because external ideas were sometimes met with a lack of interest and follow-up by internal customers, some organizations had dedicated staff ensuring the transfer of the ideas within the organization by becoming promotional agents for ideas, trying to sell it to other parts of the organization. In one organization, when the UIP staff found a champion in a department, successful adoption was more likely than when it simply forwarded the idea to R&D or a department as a whole. In another firm, it is the internal agent's role to be the champion of the idea and overcome any resistance shown by potential internal adopters:

> Our department is organized such that we are a service organization for all the businesses, and there are dedicated people responsible for taking care of particular business . . . Some of us do not necessarily associate ourselves with any specific business unit, but we try to keep up to date on the needs and strategies of all the businesses. And there's a group of people reviewing [the selected ideas], and then take the responsibility to channel it through the right internal clients . . . where the potential applications might be.

However, such approaches may increase internal coordination costs as it is necessary to actively cross departmental boundaries inside the firm, which may have different ways of working and requirements. Moreover, as more parts of the organization are engaged in the process, there is a higher chance that one (reflecting a Not-Invented-Here perspective) may resist the further development of the idea.

Discussion and Implications

Our article set out to better understand how firms deal with a promising, but challenging variant of open innovation: the management of unsolicited ideas for R&D. By combining multiple complementary methods, this study helps to map

the challenges inherent in the UIP, namely, the high number and low quality of incoming ideas as well as IP issues connected with the transfer of ownership of the ideas. Our analysis has also identified a range of practices that can increase the R&D value of UIPs along the different steps of the process, allowing us to present a toolbox that managers can choose from to (re)design a UIP for R&D purposes.

The study has implications for research on open innovation. First, we enrich our understanding of the managerial challenges of openness, documenting the problems in terms of managerial time and attention to deal with unsolicited ideas. If a firm's capacity to filter incoming ideas is overstrained, instead of allowing for a drop in the quality of handling the UIP, a firm may decide to block all incoming traffic. In turn, merely increasing the number of incoming submissions is of no value to the firm if good ideas cannot be identified because the entire process is overwhelmed. Second, by setting out some of the organizational design challenges associated with the use of external ideas, we highlight potential trade-offs faced by organizations as they seek to profit from external ideas. In particular, we expose the tensions between organizations' desire to welcome unsolicited ideas and its fears of dealing with too many. In turn, we outline practices that firms can use to proactively shape the inflow of ideas. Such efforts can help to overcome the challenges identified in our case study, including the "fear of contamination." Third, our analysis shows that profiting from unsolicited ideas requires as much attention to the external face of the firm as it does its internal face. Creating internal units or inter-departmental teams to ensure that submitted ideas are considered appropriately, transferred to potential internal customers, and then embedded in the organization is critical to ensure that the R&D potential of unsolicited ideas can be harnessed.

Notes

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3. Eric von Hippel, *The Sources of Innovation* (New York, NY: Oxford University Press, 1988).
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5. Please see the references quoted in this section as well as in the subsequent one.
6. See for example <www.bbc.co.uk/news/10228666, http://www.bbc.co.uk/news/10268979> and <www.bp.com/liveassets/bp_internet/globalbp/globalbp_uk_english/incident_response/STAGING/local_assets/downloads_pdfs/Deepwater_Horizon_Containment_Response.pdf>.
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10. We thank an anonymous reviewer for pointing us toward the Toyota example.

11. Von Hippel (1988), op. cit.

12. Eric von Hippel, *Democratizing Innovation* (Cambridge, MA: MIT Press, 2005).

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15. For example, see Huston and Sakkab, op. cit., and other references in this section of the article.

16. Eric von Hippel, "'Sticky Information' and the Locus of Problem Solving: Implications for Innovation," *Management Science*, 40/4 (April 1994): 429-439.

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20. Von Hippel (1988), op. cit., pp. 102-106.

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29. Amy C. Edmondson and Stacy E. McManus, "Methodological Fit in Management Field Research," *Academy of Management Review*, 32/4 (October 2007): 1155-1179.

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31. See <http://money.cnn.com/magazines/fortune/global500/2009/full_list/>, accessed on July 6, 2010.

32. Emanuela Prandelli, Gianmario Verona, and Deborah Raccagni, "Diffusion of Web-Based Product Innovation," *California Management Review*, 48/4 (Summer 2006): 109-135.

33. To develop an appropriate classification scheme of relevant practices, we relied on our interview evidence on which problems they might help solve and a detailed review of the online

UIPs of 14 organizations (3M, Coloplast, Dell, Google, IBM, P&G, GSK, HP, Johnson & Johnson, Nokia, Microsoft, Pfizer, Stata, and Xerox) identified in the open innovation literature as leading practitioners in this area. Two expert coders applied this coding scheme separately to our sample of firms with randomly overlapping subsamples, and all reliability checks conducted are highly encouraging (Cohen's kappa: 0.97, p = 0.00).

34. The list of use of UIPs by industry is available upon request.

35. See Philipp Mayring, "Qualitative Content Analysis," in Uwe Flick, Ernst von Kardoff, and Ines Steinke, eds., *A Companion to Qualitative Research* (London: Sage, 2004). We used a largely identical procedure to analyze the twelve exploratory interviews.

36. Our theoretical analysis had suggested that these factors already. However, during our analysis we were careful to be open to other factors. In both the case study and the exploratory interviews, we found that these three problems were indeed the most appropriate higher-level categories. Nonetheless, as highlight in the subsequent sections, on a lower level, some of the specific problems these firms experienced in practice differ from our theoretical analysis.

37. Minimum legal requirements posited that the submitted idea would at least have some relation to new product development or R&D. Minimum legal requirements were such that the firm was not bound by confidentiality when evaluating of the idea.

38. Von Hippel (1988), op. cit.

39. For example, because they felt that their review process was overstrained, the Engineering and Physical Sciences Research Council (EPSRC) in Britain has introduced a 12-month cooling-off period for repeatedly unsuccessful applicants "to help alleviate pressure on all involved in our peer review process. Over the past two decades the number of applications received by research councils has doubled. This is putting huge pressure on the peer review system, including reviewers and panels." See <www.epsrc.ac.uk/funding/apprev/Pages/rua.aspx>, accessed March 30, 2001.

40. H.W. Chesbrough, *Open Business Models: How to Thrive in the New Innovation Landscape* (Cambridge, MA: Harvard Business School Press, 2006).

41. See <https://innovation.gsk.com/gsk/ctx/noauth/innovation_at_gsk_innovation_pathway.do>, accessed April 22, 2010.

42. See <http://fordnewideas.com/main/process.html>, accessed February 14, 2011.

43. Dietmar Harhoff, Joachim Henkel, and Eric von Hippel, "Profiting from Voluntary Information Spillovers: How Users Benefit by Freely Revealing Their Innovations," *Research Policy*, 32/10 (December 2003): 1753-1769; Andrea Shepard, "Licensing to Enhance Demand for New Technologies," *RAND Journal of Economics*, 18/3 (Autumn 1987): 360-368; Joseph Farrell and Nancy T. Gallini, "Second-Sourcing as a Commitment: Monopoly Incentives to Attract Competition," *Quarterly Journal of Economics*, 103/4 (November 1988): 673-694.

44. See <www.cisco.com/web/about/ac50/ac207/crc_new/university/rfp.html>, accessed February 14, 2011.

45. This practice appears to be complementary to the use of innovation brokers such as InnoCentive or Nine Sigma. As we learned from one of our companies, the same problem might be posted on the UIP web-portal and sent to an innovation broker to maximize the chances of finding a solution. However, when it is difficult to formulate the problem in general terms and the company does not want to reveal its identity, innovation brokers are often the preferred choice. In addition, brokers were used to reduce the resource-burden of companies, as they would take over most filtering activity from the firm.

46. See <www.collaborateandinnovate.com/ci/main.jsp>, accessed February 10, 2011.

47. See <www.jjconsumerideas.com/idea-submission-process>, accessed March 10, 2011.

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51. See <www.cisco.com/web/solutions/iprize/index.html>, accessed on March 30, 2011.

52. See <http://bestbuyideax.com/>, accessed on March 30, 2011.

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54. See Alexy, Criscuolo, and Salter, op. cit.