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Exploring the support mechanisms of organisational user innovation: A case-study in a Norwegian hospital

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Abstract
This paper explores the mechanisms that support user innovations in the user organisation. In contrast to previous studies on user contributions to producer firms by integrating external users and consequently, designing the producer organisations to benefit from users, this paper contributes to a less known area of support mechanisms – those developed in-house in the user organisation itself to promote and improve its own innovation activities. In a public hospital, in-depth case analyses at the interface between users and their helpers (the facilitators who orchestrate such activities) explain how support mechanisms substantially enhance the entire cycle from generating ideas to finding partners, granting funding, realising projects, building infrastructure and finally, implementing and commercialising. A comprehensive framework of the organisational support for user innovation is developed, which extends the existing theory by integrating the process, systems and communication. Implications are drawn from this area, which is in its infancy, empirically and theoretically.
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Keywords: user innovation, organisational support, facilitation, public hospital, healthcare
Introduction

Accounts of user innovations (UIs) have progressed into a vast research field, gaining momentum as drivers of significant value creation (e.g., Agarwal and Shah 2014; Hienerth, von Hippel, and Jensen 2014; von Hippel 2005). UIs have been extensively studied in the areas of medical tools (e.g., Hinsch, Stockstrom, and Lüthje 2014; Chatterji and Fabrizio 2014, 2012; DeMonaco, Ali, and Hippel 2006; Lettl, Herstatt, and Gemuenden 2006a), sports and leisure gear (e.g., Tietze, Pieper, and Herstatt 2015; Hyysalo 2009; Raasch, Herstatt, and Lock 2008; Hienerth 2006; Luthje, Herstatt, and von Hippel 2005), juvenile equipment (e.g., Shah and Tripsas 2007) and technology software (e.g., Dahlander and Frederiks 2012; von Krogh and von Hippel 2006, 2003; Lakhani and von Hippel 2003). The users innovate to solve their own needs for which no current solutions exist, either as professionals at work (e.g., surgeons making new implants) (Lettl, Herstatt, and Gemuenden 2006a) or as hobbyists (e.g., parents creating novel baby carriers) (Shah and Tripsas 2007). Typically, users lack the initial competence in product development. Consequently, attention has mainly been directed at various forms of organisational relationships between users and producers, emphasising users as external contributors to commercial business and manufacturing (Hienerth, Keinz, and Lettl 2011; Bogers, Afuah, and Bastien 2010; Di Gangi and Wasko 2009) or integrating users into producer firms (Schweisfurth and Raasch 2015; Wadell et al. 2013; Jeppesen and Frederiks 2006). This situation has further led to the focus on UI management within producer organisations (Roy and Sarkar 2016), users’ propensity to innovate at an early stage due to managerial action on organisational mechanisms to facilitate knowledge of information technology (IT) (Nambisan, Agarwal, and Tanniru 1999) and organisational design challenges in incorporating external individual/organisational creativity into producer firms’ innovation processes (Keinz, Hienerth, and Lettl 2012). Nonetheless, in this growing body of
important insights, little is known about how the user organisation itself builds up and systematically supports its internal UIs (including collaboration with producers). This particular aspect seems important precisely because UIs are often initiated and developed in settings with focal everyday activities far from traditional producer work. To benefit from users as innovation sources in such settings, it is important to support users by designing the organisation for UI (Keinz, Hienerth, and Lettl 2012). This paper intends to extend this support side of organisational UI by examining, in practice, how the user organisation (in contrast to a producer company) facilitates its increasing UI activities (UIAs). The reported results are from an in-depth case study (Yin 2014) in Sunnaas, a public rehabilitation hospital in Norway. As a leading provider of rehabilitation services, Sunnaas depends on innovation in products and methods to constantly improve treatment. With a long and strong history of developmental work, it has many UIs initiated and driven by its personnel and patients. Reinforced by national authorities’ strengthened focus on innovation, the hospital develops organisational support to handle user ideas, projects and infrastructure.

Emphasising support mechanisms at the interface between users (hospital personnel and patients) and their helpers (the facilitators who orchestrate such activities), this paper identifies key support mechanisms (relating to ideas, projects, commercialisation, internal systems and external communication), shows that the facilitating work substantially enhances the entire UI cycle (from initiation to implementation) and explains such support’s impact on organisational UIs. Based on these findings, the suggested comprehensive framework integrates and relates key support mechanisms for organisational UI. Thus, this paper provides new insights into the organisational support of UIs, arguing for systematic facilitation’s potential to make UIs develop their impacts further. The following section draws on existing UI literature, focusing on healthcare settings and design mechanisms (in producer companies) to further sharpen the analytical lens for the study.
Next, the research method and case are presented before discussing the empirical analysis and findings. Finally, contributions and implications from the support side of organisational UI research and practice are suggested.

**User innovation theory**

**Users and healthcare settings**

UIs in organisations have generally demonstrated high innovative capacity, particularly in medical devices (Hinsch, Stockstrom, and Lüthje 2014). Moreover, UIs have been undertaken by many types of users, including ‘lead users’ at the forefront of spotting new market needs (Jeppesen and Laursen 2009; Kaiser and Müller-Seitz 2008; von Hippel 1986); ‘embedded lead users’, who are employees and lead users of their employers’ products/services (Schweisfurth and Raasch 2015); and ‘end users’, who ultimately use a product in contrast to supporting or maintaining it (Author 2015; Franke and Shah 2003; Bower 1996). Shah and Tripsas (2007) distinguish between ‘professional-user entrepreneurs’ who leave their employers to commercialise solutions and ‘end-user entrepreneurs’ who commercialise their own products (Haefliger, Jäger, and von Krogh 2010; Baldwin, Hienerth, and von Hippel 2006). Lettl, Herstatt, and Gemuenden (2006a) distinguish between users as ‘inventors’ who originate an innovation (e.g., neurosurgeons inventing extremely precise equipment that outperforms standard instruments) and ‘(co)-developers’ – inventors who become developers later in the innovation process, performing the typical function of manufacturers as they contribute to the construction of radically new medical equipment. Lettl and Gemünden (2005) provide insights into the conditions from which medical equipment technology users start entrepreneurial activities and finally become manufacturers themselves. However,
individual users do not have to develop everything on their own; they can also benefit from innovations developed and freely shared by others, such as ‘open-source collaborative user innovators’ (Baldwin and von Hippel 2011). Chatterji and Fabrizio (2012) find that user contributions from physicians influence manufacturing firms’ inventions in the medical device industry by providing a broader set of follow-on technologies and that these occur earlier in the product life cycle than other corporate inventions. In another study, Chatterji and Fabrizio (2014) argue that inventive collaborations with users improve corporate product innovation, particularly in new technology areas of radical innovations. In their research on the discovery of off-label drug therapies, DeMonaco, Ali, and Hippel (2006) find that external clinicians play a major role as lead users. Based on four cases in the field of medical equipment technology, Lettl, Herstatt, and Gemuenden (2006a) document users’ contributions to radical innovation, addressing how manufacturing firms can benefit from innovative and entrepreneurial users in the early phases of innovation projects. Producer firms also learn by interacting with users (Lettl, Herstatt, and Gemuenden 2006b). Corporate investments using venture capital have been analysed in the context of the medical device industry (Smith and Shah 2013). Users are distinct from other innovators in that they have personal experience with a product or a technique that is central to developing the solution for their innovation (Hinsch, Stockstrom, and Lüthje 2014). In this present paper, the users represent a mix of hospital personnel (i.e., professional users) and patients (i.e., hobbyists and end users), while remaining embedded in the hospital organisation. The literature on the mechanisms supporting organisational UIs has so far been developed in relation to producer companies, as addressed below.
Support mechanisms for user innovations (in producer firms)

The UI literature views users and producers as organisationally distinct (Schweisfurth and Raasch 2015). Research has focused on the benefits of employing users for corporate innovation in producer firms, where dual embeddedness in user and producer domains enables the absorption of sticky knowledge and helps shape users’ cognitive structures (Schweisfurth and Raasch 2015). In a similar vein, Wadell et al. (2013) explore the incorporated users’ role in innovation activities in the business unit of a large medical technology company with a long experience of employing and incorporating physicians and nurses in its product development activities. Jeppesen and Frederiksen (2006) investigate users’ contribution to firm-hosted user communities. Hienerth, Keinz, and Lettl (2011) highlight the introduction of user-centric business models in large, established companies (LEGO, IBM and Coloplast) that have integrated users into their core business processes. To benefit from users as innovation sources in producer settings, Keinz, Hienerth, and Lettl (2012) argue that organisations must be designed for UI. They propose four design strategies (search, harvesting, cooperation and ecosystem) for utilising external users in producer firms’ commercial activities. The first two strategies refer to companies that only occasionally engage in UIAs, such as limited events, contests and so on. Cooperation builds on relatively few external contributors on a continuous basis, whereas the ecosystem focuses on collaboration with many companies/external individuals, such as toolkits or user communities. Central to any of these strategies are the components of people, work processes, incentives and coordination systems. Regarding facilitation, the cooperation approach emphasises appointing persons responsible for relationship management with lead users and external experts. Another important function is facilitating project-to-project learning. Nambisian, Agarwal, and Tanniru (1999) highlight knowledge acquisition and knowledge conversion as important organisational
mechanisms for enhancing UIs as they address the question of what managers can do to facilitate the early stage of innovative IT ideas among users. To this end, IT innovation initiation is delineated as a knowledge creation process, enabled by managerial design actions in the form of mechanisms. In their case study in the medical device industry, Hinsch, Stockstrom, and Lüthje (2014) find that UIs in techniques trigger product innovation by users and manufacturers, arguing that techniques can only be diffused with the involvement of diffusion agents and their interpersonal interaction and joint performance with possible adopters. However, none of these studies emphasises the support side of UIs at the interface among facilitators, professionals and patients within a public user organisation. Public organisations seem interesting to study as they typically depart from conventional economic principles by serving dual goals of social and societal values in addition to economic value through increased earnings and cost savings, independently or as co-partners of commercial companies (e.g., Andersen, Gårseth-Nesbakk, and Bondas 2015). Baldwin and von Hippel (2011, pp. 1414) state that UI research is urgently needed in public organisations because they anticipate that ‘both personal freedoms and social welfare will increase as a result [of UI]’. UIs in public settings have focused on library users of information search systems to identify the characteristics of innovating users (Morrison, Roberts, and von Hippel 2000), as well as the role of users in scientific instrument innovations in biotechnology, with large businesses and the state as major actors (von Hippel 1976). In a user organisation with its core activity far from producer work, support mechanisms of UIs may be even more critical. To provide an initial understanding of what internal mechanisms support UIs within a public user organisation, I base my report on an in-depth case study in a hospital where this phenomenon emerged.
Research method and case

Due to the exploratory research question, an in-depth single-case study design (Yin 2014) has been chosen, along with an extended case method (Burawoy 1991), which builds on and brings together different approaches of existing literature by using detailed and descriptive empirical case-study data to integrate and extend the UI theory. The focus is on the interface between the support side (the facilitators) and the users in their own organisation, emphasising the ongoing activities to facilitate UIs. Facilitation refers to activities that make tasks for others (the users) easier by enabling individuals, groups and organisations to collaborate, work more effectively and achieve synergy to accomplish a common goal (Kaner 2014). User personnel include doctors, nurses, ergonomists, physiotherapists, speech therapists, psychologists and so on, whereas user patients have severe physical and/or cognitive injuries (e.g., stroke, amputation, paralysis and trauma). Many patients are injured for life and need recurrent hospital treatment, as well as individually adjusted aids and support at home and/or at work. UIs are driven by the lack of satisfactory aids for these rather marginalised groups to improve recovery and learn to cope/live with handicaps that permanently restrict their autonomy and quality of life. The users lack the capacity to handle all innovation activities on top of regular hospital work or impairments. Therefore, a key to conducting UIs is the orchestration and facilitation work executed by internal innovation resources.

The case organisation

Globally, Sunnaas Rehabilitation Hospital is among the leading specialists in physical medicine and multidisciplinary rehabilitation, treating around 6000 patients annually by providing medical teams, tailored to each patient’s special needs. Sunnaas’ vision (Strategy document 2015–2018) is
to advance from a hospital with some innovation activities to become ‘an innovative hospital’ in its thinking and working to ‘create tomorrow’s solutions to improve treatment and rehabilitation service by, with and for its users’. Owing to recent policy demands that even more focused, systematic and measurable efforts be employed to make innovation part of daily hospital operations, Sunnaas, in 2011, established an Innovation Unit (that would report to the CEO), comprising the innovation head and a consultant to facilitate innovation activities, including orchestrating the extended Innovation Team. The latter consists of nine key representatives (healthcare professionals) from the main departments (Clinic, Cooperation and Research) that innovate in strategic priority areas. The team’s role ‘is to be a catalyst, orchestrator, and advisor for innovation activity, both internally and toward external institutions, partners, and business—nationally and internationally’ (Strategy document 2015–2018). Ensuring the rights and interests of patients and relatives, a user patient representative is a regular team member. Occasionally, the CEO participates, while the final member is an external innovation advisor from a national innovation network in the medical technology area (with members ranging from large established companies to small start-ups, research institutions, funding organisations, science parks with incubators and various public institutions and hospitals). Sunnaas is expected to undertake and is measured on innovations regarding service delivery quality, efficiency and effectiveness (e.g., White Paper Report No. 16, National Health and Care Services Plan 2011–2015; No. 47, The Coordination Reform—Proper Treatment—at the Right Place and Right Time 2008–2009), which require new ways of thinking, working and organising beyond traditional intra-organisational hospital operations. Sunnaas is an early mover in this landscape, with the entire population as potential users. Complex user needs, combined with accessible technology and a rapidly growing
medical technology industry, create opportunities for UIs in the entire course of preventive efforts, diagnosis, treatment and recovery.

**Data gathering**

As part of a larger research project on innovation (January 2012–December 2015), the data in this paper highlight the facilitation of UIAs at Sunnaas from January 2014 to December 2015, selected because during this period, these activities increased substantially and assumed more systematic and structured forms due to facilitation. The primary data sources are the Innovation Unit and the Innovation Team, given their efforts to systematically support UIAs. Observing the team’s meetings, words and actions was particularly important because these stood out as central arenas of and for organisational practice (Jarzabkowski and Seidl 2008), where support activities were debated, decided on and evaluated. I listened to what people expressed through their presentations, discussions, concerns and agendas in eight team meetings, each lasting approximately two to three hours and held regularly about every other month. I recorded all meetings with the participants’ consent and transcribed them verbatim to enhance validity, resulting in a 150-page document. Field notes were frequently used to record follow-up questions in conversations with the informants during pauses, after meetings or at lunch, all of which enhanced thick descriptions (Geertz 1973) and a deeper understanding of the activities. To ensure confidentiality, the quotes refer to the type of actor (i.e., facilitator, user personnel or user patient). The secondary data include observations of innovation seminars and cluster meetings, as well as UI projects (from start to finish), interviews and informal talks with facilitators, personnel and patients, along with their meetings with business companies and other external entities. The secondary data (gathered throughout the whole project
period) were used to gain a deeper understanding of the actors and the progress of support activities. These also included the texts that the participants were using, working on and referring to in the team meetings (e.g., minutes, grant applications, assessment procedures, etc.), as well as other written and electronic materials (websites, archival records, information about external partners/collaborators, national and regional policies, funding sources, etc.).

**Thematic case analysis**

Thematic analysis was conducted to enable a deep understanding of the case and allow the exploration of categories to emerge from the data and expand beyond individual experiences (Guest, MacQueen, and Namey 2012; Braun and Clarke 2006; Daly, Kellehear, and Gliksman 1997). Familiarising myself with the data, I initially searched for meaningful patterns that seemed important to describe the facilitation of the UIAs, guided by questions such as what people are doing (to grasp organisational activities and processes), what they are trying to accomplish (UIs), how they do these (efforts, actions and facilitation undertaken) and through what means (mechanisms, etc.) and how the informants discuss and interpret ongoing activities (in meetings, etc.). Activities were then assigned codes (names). Continuing the analysis, I searched for themes among the codes (where themes became categories for analysis), reviewing and sorting the themes into overarching ones under the label ‘organisational support mechanisms’. The analysis involved an iterative process, back and forth across pertinent literature, data and emerging codes and themes (Guest, MacQueen, and Namey 2012). It became clear that the facilitators’ actions could be structured into several organisational support activities (codes) that involved them throughout the UI process. As a result, four core themes were singled out, with various activities (codes) pertaining to each (Table 1). Finally, similarities and differences between emergent themes and
the existing UI theory were carefully compared to examine the relevance and effects of the facilitators’ actions (Yin 2014). This resulted in the theory’s expansion and refinement, leading to a new framework of UIs’ organisational support mechanisms, where integration of ideas, projects, internal systems and external communication was central to the realisation of UIs, as outlined in the next section.

Table 1. Organisational support and facilitation activities at Sunnaas

<table>
<thead>
<tr>
<th>Organisational support mechanisms</th>
<th>Activities</th>
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<tbody>
<tr>
<td>Facilitating ideas</td>
<td>Gather user ideas.</td>
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<tr>
<td></td>
<td>Validate and ‘green light’ user ideas.</td>
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<tr>
<td>Facilitating project realisation</td>
<td>Arrange for collaboration.</td>
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<td></td>
<td>Apply for external funding.</td>
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<td></td>
<td>Prepare for implementation and commercialisation.</td>
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<tr>
<td>Facilitating internal systems</td>
<td>Build systems and infrastructure.</td>
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<tr>
<td></td>
<td>Professionalise people and the organisation.</td>
</tr>
<tr>
<td>Facilitating external communication</td>
<td>Develop and maintain relations with individuals, organisations and networks.</td>
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<tr>
<td></td>
<td>Provide information and updates through social media.</td>
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</table>

Organisational support of user innovation at Sunnaas

Since 2011, innovation projects at Sunnaas have grown substantially (counting 27 finished and 25 ongoing projects by the end of 2015), with a lot of engagement and activities among employees and patients regarding idea generation and development. Sunnaas also receives external entities’ requests to participate in projects because of the hospital’s innovative reputation among collaborators and businesses. Thus, it needs to establish routines for all required activities, processes and decisions. Its innovation projects depend on well-functioning and flexible structures, while the clinic needs predictability regarding its resources. To ensure that innovation is driven
efficiently and effectively, with proper use of resources, and closely fits clinical needs, it is vital
that good routines be developed for decision making in innovation projects. The Innovation Unit
and the extended Innovation Team orchestrate and facilitate the UIAs together.

We are the facilitators. We are not supposed to own or run projects. Our job is to ensure
that Sunnaas is able to conduct and progress useful innovation projects that serve our needs.
We are not to independently invent or carve out projects. The requirements coming from the
clinic, the patients and other units steer us (facilitator).

Their work focuses on organisational support activities – facilitating ideas, projects, internal
systems and external communication.

Idea facilitation: gather, validate and ‘green light’ user ideas

To gather ideas, the facilitators developed a mail box (‘idea bank’) for users to post innovative
proposals. Since 2011, over 200 ideas have been posted. Ideas come from professionals and
patients (and sometimes their relatives) on how and why innovations are needed to better meet
their experienced needs for treatment and/or aids to cope with daily life challenges related to
reduced movement and/or cognitive impairment. Because both patients and personnel have direct
experience with particular needs and the lack of satisfactory solutions, they quite precisely
perceive the types of helpful solutions. To illustrate, many patient groups risk having bedsores,
which may need long-term hospitalisation (an open bedsore may take a year to heal and possibly
require surgery to close the wound). Such patients need to change positions about four times per
hour. Special furniture exists for this purpose, but it did not work to their satisfaction. To prevent
patient suffering and reduce the high cost of hospitalisation, the idea of developing special textiles for pressure release came up in a conversation between medical experts and patients with spinal cord injuries. The patient requirement was clear: ‘Make me something I can wear on travels, and I’m in’ (user patient). A doctor immediately suggested special clothes (now on the market) that could offer better preventive qualities than existing aids. The facilitators are the first receivers of such user ideas, which they evaluate on certain criteria.

When an idea arrives, we do a first idea assessment, a general value assessment and a general carry-out assessment. We work through a list of values that we measure the idea against. Does the idea comply with the visions of Sunnaas, our strategies and goals? Does it fit with the portfolio of our patient groups? What kind of use value will the idea provide to patients, employees, relatives and our treatment groups, as well as to the milieu and efficiency? Thereafter, we evaluate whether it is possible to carry out, what resources [internal, external, etc.] and what kind of financing we need (facilitator).

The general assessment is to prevent spending a lot of time and resources on ideas that are too difficult to execute. When an idea meets the relevance and use-value criteria, it should be strongly tied to its functional area – the functional leader, competence groups, clinical sections, multidisciplinary teams or the hospital’s innovation clusters, depending on the project type. The idea originator plays an important role in firmly anchoring it. Together, the professional experts evaluate its novelty, and ‘if we don’t know the answer, we need to find those who know’ (facilitator). Sometimes, the validated ideas can be taken further, completely on an internal basis, as part of what Sunnaas already does or should do. However, typically, external funding should be applied
for through competition for tender bids from public or private sources. Finally, when all these considerations are taken and passed, ‘then someone has to make the final decision if this is a go or not and sign the application. This is to ensure that those with the responsibility for the resources also have the final word’ (facilitator). Who this ‘someone’ is depends on the project type, size and who is involved (the unit leader in small projects); if the project cuts across multiple teams, it moves further up, and for very large projects, the top management should decide. Once the project is established, the facilitators help support its realisation. ‘We help all the projects that have been given the green light and particularly, the highly strategic ones’ (facilitator). In comparison, Di Gangi and Wasko (2009) address the balance in the decision-making power between a producer firm and the external user community from which it adopts innovations. The two parties must reach a consensus and then clearly articulate the idea, such that the adopting context can value, assimilate and apply the idea in its operations. Although Di Gangi and Wasko’s study on organisational ‘stealing’ of ideas from external user communities takes a rather different approach, the validation and assimilation of ideas seem similar and highly applicable to this study of facilitating in-house UIs. This gives a reason to argue that facilitating ideas in terms of gathering, validating and approving them constitutes an important early stage in the organisational support of UIs.

Facilitating the realisation of user innovation projects

Once an idea is transformed into a project, several factors should be put in place, including funding, collaboration and implementation. Many project groups held the opinion that facilitators’ hands-on assistance was decisive as they were considered resources for patients and employees.
Supporting these activities was critical due to UI’s demanding nature, as expressed by a user personnel who worked on a product that was later commercialised:

These innovation projects are not instead of; they’re always in addition to the regular work we do. Weekends, holidays, nights and leisure time have been sacrificed. Without them [the facilitators], my project would not even get started, simply because I would not know where to find the right people, particularly external expertise or where to seek funding.

This clearly showed the perceived importance of the facilitators’ work in realising projects. Particularly, funding, collaboration and implementation support were highlighted as essential.

Seeking external funding of user innovation projects

Since user demands are often highly specialised, the products are costly to make, and the hospital itself lacks the necessary finances or in-house resources for production. Therefore, obtaining project funding from various sources is necessary to realise such innovations. A key facilitator competence then becomes applying for the right type of funding, as well as knowing how to make proposals. The relevance of various sources depends on the project phase, the target (primarily business versus research) and the collaborators involved. Currently, innovation in healthcare is a priority, with public monetary resources available. Typically, the projects have received financial support from Innovation Norway (the government’s most important instrument for innovation and development of enterprises and industry to stimulate collaboration between businesses and the public sector, commonly through public research and development contracts), the Research Council of Norway (typically user-driven, industry-oriented, research-based innovation projects), Regional Research Funds (supporting research and development), the South-Eastern Norway Regional Health Authority (SENHRA), the Directorate of Health and InnoMed (need-driven innovation).
Despite the tough competition, Sunnaas has a high grant rate on its applications. One facilitator commented, ‘Since the risk of not winning the bid is high, we need to prioritise very carefully a number of quality considerations to select projects with enough potential for us to put resources into’. Typically, they first compete for bids on pre-project funding and later, for main project funding. The funding often requires a substantial number of hours on the part of the participating organisations, the so-called ‘own time investment’, combined with the grant (typically a 50-50% split). A user personnel illustrated the funding process:

First, the idea was to ask the TTO [Technology Transfer Office] if this was worth pursuing. They checked it and found that it did not exist [yet]. So we worked out an application and received half a million [NOK] from the Directorate of Health. I was put in touch with an industrial designer in a company that had done something similar before. They were enthusiastic; we teamed up, developed a pre-project and performed extensive testing. [...][M]ore funding was needed; we received two rounds of innovation funding from SENHRA that we spent on further product development.

Previous research has also emphasised how user innovators try to attract external funding (Lettl, Herstatt, and Gemuenden 2006a). These studies highlight crowdsourcing (Mollick and Nanda 2015) and venture capital investments (Smith and Shah 2013), stressing the critical role of gaining financial support to realise UIs. However, these studies do not specifically address the facilitator’s role in securing funding by assisting in pointing out relevant financial sources, framing and writing the applications and so on.

Searching for collaborators and external partners
According to a facilitator, for approved ideas, ‘we consider functional milieus or companies to contact and team up with the relevant milieu in-house. This can take some time, as we need to be absolutely sure that the project partners make a good match’. User innovators are put in contact with relevant external collaborators, such as established firms, start-ups, entrepreneurs, research institutions, public organisations, other hospitals and healthcare institutions, municipalities, regional health authorities, nursing homes, special patient-interest organisations, innovation networks, the TTO, relatives and other stakeholders, to realise their innovations. Particularly, users partner with external collaborators for product development and commercialisation. In product development, the facilitators typically support the collaboration of a mix of patients, personnel and production firm(s).

During the projects, the patients are with us all the time, commenting, correcting, posting wishes and suggesting improvements. They know very well how things must be to function, and they are so creative in finding solutions to their compound problems. Simultaneously, we depend on producers and other experts to develop the actual product. As for prototype A, the fit could be better, in addition to some unexpected errors. These days, we are waiting for prototype B to arrive from the manufacturer so we can make new measurements and test for further adjustment on larger scales and with different patient groups (user personnel).

This feedback confirms many other studies showing that in this kind of open innovation (Chesbrough, Vanhaverbeke, and West 2006), specific user knowledge (Shah and Tripsas 2007), combined with supplementary (producer or other) knowledge, is essential to the production of well-adjusted UIs (e.g., Lettl, Herstatt, and Gemuenden 2006a). However, the additional element that these collaborative relations are systematically matched across organisations and institutions
(domestic and international) with the help of facilitators with a wide network of contacts seems different from previous studies.

Implementation and commercialisation

From the many operational projects, several are implemented in the organisation. For example, a user personnel noted, ‘The technical equipment we developed is now out in the clinic, in use by the therapist operating it and the patient benefiting from it’. Several projects are approaching the commercialisation phase, whereas only a few have entered the market to date. In these projects, the facilitators supported the user innovators in their commercial activities by arranging meetings with commercial actors, applying for funding to make user manuals (to accompany the products when sold), supporting the process of the healthcare aids’ certification and approval by relevant authorities in compliance with regulations and so on. Nevertheless, the commercialisation experience is at an initial stage. Moving into this domain also poses new fundamental questions, such as a public hospital’s role in commercial activity.

As a public hospital, our primary objective is to treat patients. We need common guidelines from the authorities on how to deal with all the projects that are about to go commercial. We have walked many new paths here. Is the hospital supposed to take the product all the way to market? (innovation head).

A user personnel reflected: As employees, we are not supposed to enrich ourselves on the patients; we are not supposed to buy or sell. In the commercialisation process, we use partner companies and their sales channels but within our framework of values. Advertising goes through them and relevant patient associations, never through us – that would be very wrong.
Patenting is an option for some projects. Owned by the University of Oslo and Oslo University Hospital (to which Sunnaas belongs), the TTO then advises and helps with filing patent applications.

The need to keep a lot of secrets to avoid disclosure of the products is a bit challenging, but I’m certainly not doing this for profit. The project will run at a loss, anyway, given all the time spent on developing, adjusting and prototyping. If my invention can help only one more person, I would be happy. Now that we can actually provide a product to many people, it’s very satisfying [...]. It’s a matter of bringing autonomy into a very constrained world (user patient).

A recent idea involves returning a certain percentage of commercial sales into a trust fund to help finance new project innovations in the hospital. Research on user commercialisation (e.g., Yadav and Goyal 2015; Haefliger, Jäger, and von Krogh 2010; Shah and Tripsas 2007) highlights the user involvement in realising innovations but does not identify support from the user organisation itself as important for smoothing and enhancing commercial activity.

**Facilitating internal systems**

According to the organisational embeddedness literature on UIs, producer firms have incorporated (Schweisfurth and Raasch 2015; Wadell et al. 2013; Jeppesen and Frederiksen 2006) external users to benefit from them, requiring that the producer organisations be designed accordingly (Keinz, Hienerth, and Lettl 2012). From the in-house user approach of this particular case, the findings resemble some of the systems and coordination issues raised by Keinz, Hienerth, and Lettl (2012), as the facilitators are about to establish the infrastructure for their UIAs at Sunnaas.
Building infrastructure

The increasing user activities at Sunnaas require further infrastructure development, as illustrated by the following quote from a meeting:

In the light of recent developments, there is an increasing need for us to define routines and structures in the hospital to make our work with the innovation processes more predictable, to clarify who is going to be involved and who can say “yes” or “no” to the various stages.

In response, the facilitators have worked out a decision model for handling user ideas, addressed in the above-mentioned idea bank. The facilitators also coordinate with other health institutions, following the directions of regional health authorities. Here, a new and common steering and reporting system is central to smooth the administration of the increasing amount of innovation projects, as well as a project database. Furthermore, the facilitators work closely with other hospitals in the region, as expressed by one of them:

I’ve looked at how two other hospitals do things. However, we are rather different from them. We are smaller, less bureaucratic, with much shorter decision lines. I have drafted a procedure to handle ideas and project proposals that takes the best from the three hospitals and that fits us the best. It is very much based on what we already do, only in more explicit terms.

The facilitators are also concerned about how they balance routines with flexibility. ‘What is important is doing this without a lot of paper work. Innovation needs space, and we need to be flexible enough to keep the enthusiasm that has to lie behind any innovation’.

Professionalising the organisation on innovation work
The facilitators try to professionalise the innovation work in several ways. After a few years of strong innovation focus, the project activities have gained momentum and developed into innovation clusters, divided into the following functional priority areas: cognition, technology and eHealth, virtual rehabilitation, movement and patient security. The clusters are currently central hubs for the hospital’s innovation work, with regular meetings and arrangements for development and knowledge sharing. Such managerial action to facilitate knowledge represents an important organisational mechanism that increases users’ propensity to innovate (Nambisian, Agarwal, and Tanniru 1999). Nonetheless, the clusters operate to a large extent because of individual prime movers who devote extra time and enthusiasm to make these work. One priority for the facilitators is to enable the clusters to operate more collectively yet independently by learning how to handle their innovation activities according to the hospital’s professional standards. A related priority is to encourage and professionalise people with the responsibility to initiate and manage UIs in an already busy work environment. Sunnaas’ vision is to be among the best in rehabilitation worldwide. ‘Then, we need to get the leaders to involve themselves much more actively and systematically’ (innovation head). After a long process, the facilitators have managed to include these issues in the leadership agreements, which state each leader’s work tasks in the hospital. The facilitators try to establish and internalise new systems and work processes to better meet organisational goals and strategies, which are central issues to be handled in the organisational support of UIs (Keinz, Hienerth, and Lettl 2012).
Facilitating external communication

The facilitators consider it their important task to keep and develop good relations with external individuals and businesses to attract the right people and make their UIAs known.

The first year, I spent a lot of time visiting external milieus to be part of external networks, gatherings and conferences, giving presentations and saying, “Here we are”. Thereafter, it was important to land the projects to prove that we [were] here to stay (innovation head).

For example, as the facilitators settled to build up a gamification milieu, they involved themselves in a major national event that annually gathered the most knowledgeable, creative IT nerds to have fun, collaborate and compete. Sunnaas offered a prize that provided unique relations in this environment of young game developers. In the IT field, they also maintain close contact with academic institutions and master’s students who have been working on their projects, using computer games for physical and mental rehabilitation exercises. Furthermore, in a seminar (with the medical technology network), users from Sunnaas posted their ideas in front of a packed auditorium representing various businesses, with potential solutions on how to make the users’ wishes come true. An efficient way to contact many producers, it spurred a range of UI projects at Sunnaas. The external advisor (from the medical technology network) also held a 30%, three-year position at the hospital, based on external funding, giving ‘extra momentum to our innovation processes, as she came from [the] industry and [was] able to connect relevant external firms and put together working groups’ (facilitator). Finally, the facilitators are active on social media ‘to tweet the world [and] update [it]’ on their UIAs, as expressed in a team meeting. Developing and maintaining relations with actors with compatible knowledge and resources is an important pillar in the UI theory (e.g., Yadav and Goyal 2015; Jeppesen and Laursen 2009; Lettl, Herstatt, and
Gemuenden 2006a). Hence, facilitating external communication and keeping relational transactions with others appear beneficial to realise UIs at Sunnaas.

Discussion and implications

This study has investigated the mechanisms that support UIs in a user organisation at the interface between users and helpers (the facilitators organising such activities). The facilitation activities involve handling ideas, professionalising and executing developments to continuously improve innovation work. The aim is to orchestrate innovations by rolling them out, supporting their realisation and implementing them as helpful patient aids and treatments. The findings show the facilitation work’s overall positive effect on the idea generation and project execution of UIs, as these have increased during the years with facilitation. The UIs’ progress from idea generation to project realisation shares many similarities with the process displayed by Tietz et al. (2005). However, this present in-depth study delves deeper into validation and extends the process to implementation within the organisation and market commercialisation. Facilitation represents an essential element that spans the entire process from generating ideas, finding partners, granting funding, establishing and undertaking projects to commercialisation and implementation. The findings suggest that an organisation’s support for its UIAs requires a comprehensive approach that encompasses idea and project execution, development of internal structures and professionalisation, as well as handling external communication on a broad basis. The analysis shows that previous research supports each identified element’s importance to the realisation of UIs. The extent of change agents’ promotion efforts positively influences innovations (Keinz, Hienerth, and Lettl 2012; Di Gangi and Wasko 2009; Nambisian, Agarwal, and Tanniru 1999).
However, based on a seemingly different form of organisational constituency from those addressed in the literature by integrating users into producer firms (Schweisfurth and Raasch 2015; Wadell et al. 2013; Jeppesen and Frederiksen 2006), the single elements identified in this hospital case have previously not been combined and presented as an integrated approach to the organisational support of UIs within the user organisation itself so as to develop and strengthen its own UIs. This study contributes to UI literature by identifying the importance of the support side of UI facilitation in a setting that is far from product development and commercial activity by suggesting a comprehensive framework (Figure 1) of organisational UI that integrates five key elements – ideas, projects, implementation/commercialisation, internal systems and external communication.

Figure 1. Framework of support mechanisms for organisational user innovation
The facilitators provide more momentum and support to actually take on and carry out UIs in the organisation, developing these towards more systematic and embedded user-oriented innovations. Consequently, managers of public and private innovating organisations should consider this approach if their aim is to enhance user involvement or boost their UIAs. The results have illuminated the facilitators’ role in an organisation’s UI, based on a single case of a public hospital. Further research is needed to test, extend and explain the support for organisational UIs’ mechanisms in other settings and industries, as systematic facilitation seems to strengthen the UIs’ future scope and impacts on both individual autonomy and business profit. Finally, research into combinations of economic and societal, private and public values derived from UIs is also encouraged.
References


Author. 2015.


