Users' search mechanisms and risks of inappropriateness in healthcare innovations: The role of literacy and trust in professional contexts

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ABSTRACT

In the context of professional service organizations, user engagement with knowledge search might generate significant risks of inappropriateness to innovation processes. Previous research suggests that professionals would then keep users at arms' length, controlling the design and implementation of innovations internally. This study overcomes this view investigating how professional service organizations can enable users' knowledge search while controlling for the risks of inappropriateness. Combining a qualitative research on 5 innovation processes in healthcare organizations with quantitative research on 110 service users, our findings highlight that professional providers, such as senior clinicians, shaped their tactics according to the 'threats' of laggards, i.e. users searching knowledge outside of professional logics of appropriateness; more than to the opportunities of lead-user communities. Professional providers sought to "activate" users' engagement with knowledge search by investing on their literacy, i.e. showing the basics of the logic of appropriateness informing their decision; and on trust relationships, i.e. becoming transparent on the criteria of knowledge selection during the innovation processes.

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1. Introduction

Innovation research emphasizes the importance of searching knowledge beyond organizational boundaries to differentiate the sources of new ideas and information (Li et al., 2013; Raisch et al., 2009; Rosenkopf and Nerkar, 2001). Most studies have usually investigated mechanisms used by one firm to search the knowledge produced by other firms, e.g. alliances, acquisitions, employee mobility, open source platforms, pyramiding, and service intermediaries (Savino et al., 2015). More recently, firms have been also recommended to search the knowledge produced by user communities. Some users proactively search and produce knowledge about new technical and scientific advancements to evaluate their service providers and market opportunities (Bogers et al., 2010; Greer and Lei, 2012). So, firms can gain important competitive advantages by identifying relevant users and incorporating their knowledge in the innovation processes. Mechanisms abound, such as the use of IT platforms, user enrolment and focus

groups (Hienerth et al., 2014; Nahuis et al., 2012; Parmentier and Mangematin, 2014; Yoshida et al., 2014).

Noticeably, most research in this field has focused on large private firms pursuing shareholder value in high-tech industries (Greer and Lei, 2012; Savino et al., 2015). These studies tend to overlook the risks of user engagement, as they assume that firms can rely at least on lead-users, and keep others at arms' length. The generalizability of this assumption is however questionable in organizations with smaller size, different goals and embedded in low-tech sectors (Lane et al., 2002; Savino et al., 2015). These organizations face relevant risks when their users search new knowledge; and very little is known about what they should do to prevent unintended consequences.

This study addresses this gap, investigating the experience of healthcare organizations attempting to elicit knowledge search from their patients while facing threats to the appropriateness of care. Healthcare organizations represent an exemplar of professionalized service organizations, which possess two important features (Abbott, 1988; von Nordenflycht, 2010). First, their services are based on the work of professionals (e.g. doctors, nurses), who abide by logics and ethical codes of service appropriateness, i.e. generate maximum value for users, rather than for shareholders or others. Second, professional work is informed by expert knowledge, acquired over long years of certified professional development and training, and virtually inaccessible to managers, employees, and users (Radaelli et al., 2014). These features

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generate competing demands on patients' knowledge search. The logics of appropriateness imply that users *must* be engaged with knowledge search to increase the appropriateness of innovations. Users, however, cannot possess the skills and abilities necessary to search and absorb knowledge appropriately; and thus struggle to navigate misinformation and fraud (Deer, 2011; Kraft et al., 2015; SteelFisher et al., 2015). In several occasions, patients have pushed professional organizations to spend money on inappropriate innovations, or refused to attend appropriate new services. Healthcare providers must do something to orient patients' knowledge search toward principles of appropriateness, without locking patients into their own ideas. How they can do so remains unknown. So, we ask: *how can professionals elicit patients' knowledge search during innovation processes while reducing the risks of inappropriateness*?

To address this question, we developed a mixed-method study of multiple service innovations. The manuscript is organized as follows. First, we review the literature to identify key concepts and theoretical gaps. Second, we describe the qualitative research used to induce an interpretive model of users' engagement with knowledge search. The findings informed the taxonomy of knowledge search behaviors, i.e. some patients stay passive or reactive in the search of new knowledge, with others search knowledge to challenge professionals' decision-making, and only a few acted as lead-users. Building from this, we describe the role of patient activation, use of traditional/virtual sources of information, health literacy and trust in eliciting patients' knowledge search. Later, we describe the quantitative research that tested this induced model on a sample of 110 patients with chronic obstructive pulmonary disease (COPD). Finally, we discuss the results and contributions to literature.

2. Theoretical background

2.1. Knowledge search and logics of appropriateness

Service innovations in healthcare are required to follow principles of appropriateness, i.e. "care is effective based on valid evidence; efficient [in terms of] cost-effectiveness; and consistent with the ethical principles and preferences of the relevant individual" (WHO, 2000; p. 2). Healthcare innovation processes derive their legitimacy from (i) the rigor of their scientific approach, and (ii) the response of patients. Unscientific and untested services should not be provided to patients as they might introduce risks to the safety of patients; while services that are not attended by patients should be changed because they are not meeting the expected appropriateness. One implication is that processes of healthcare innovation should be structured into a formal stage of knowledge search, in which scientific and experiential knowledge is identified; and a stage of recombination, in which the complex knowledge is translated into new services. Professionals are expected to: (i) search relevant scientific evidence on the effectiveness and costs of new interventions; (ii) search experiential/contextual knowledge from their own practice, and from peers; (iii) discuss and recombine this knowledge in multi-professional teams; (iv) develop structured pathways that describe the new service, to allows replication and assessment; and (v) test the new service on a selected group of patients to ascertain the consequences (Walshe and Rundall, 2001; West and Wallace, 1991). Clinicians *must* prove the appropriateness of their decision-making by producing evidence of effectiveness. They usually apply an 'evidence pyramid', and collect evidence from meta-analyses and systematic reviews to legitimize change; and produce evidence from Randomized Clinical Trials (RCTs) or cohort studies to demonstrate improvements (Murad et al., 2016).

Overall, through education and practice, these expectations consolidate into *logics of appropriateness*, i.e. institutionalized rules, roles and norms that demand clinicians to have high standards regarding what knowledge should inform their innovations, where they should search it, and how they should apply it. So, for instance, clinicians use scientific journals and peer reviews, and avoid generic sources of information, such as newspapers, websites and forums (Gabbay and le May, 2004), because these are regarded as weak evidence and unfit for the standards of appropriateness.

By contrast, newspapers, websites and forums represent the privileged sources of information for patients, who typically lack the ability to navigate more complex knowledge (McMullan, 2006). The knowledge embedded in these media is often inaccurate, blown out of proportions or intentionally mischievous. Lured into the prospects of "easy" and/or "immediate" cure, patient groups have often pushed providers to invest money on very inappropriate innovations (Bodemer et al., 2012; Claassen et al., 2012). Clinicians need to orient patients' knowledge within acceptable logics of appropriateness, while allowing for some creativity. Previous research does not specifically explain how they can do so. Rather, three neighboring research streams described possible approaches. To prepare the theoretical background of our empirical research, we review these research streams, i.e.: (i) knowledge search beyond organizational boundaries; (ii) user-based innovation; and (iii) sociology of professions.

2.2. Knowledge search beyond organizational boundaries

Several past studies have looked at mechanisms for knowledge search beyond organizational boundaries as necessary to access non-redundant ideas (Savino et al., 2015). To reduce problems of cognitive lock-in, firms should differentiate the knowledge sources, e.g. other firms in their supply chain, direct and indirect competitors, consultancy firms, and research institutions (Chen et al., 2011; Grimpe and Sofka, 2009; Kohler et al., 2012; Laursen and Salter, 2004). Firms can implement several mechanisms to search and absorb new knowledge, e.g. alliances, firm acquisition, employee mobility, open source platforms, pyramiding, service intermediaries and collective research centers (Savino et al., 2015).

These studies suggest that *weak ties* (i.e. infrequent and distant relationships between knowledge sources and recipients) are salient to identify non-redundant knowledge, while *strong ties* (i.e. more frequent and structured relationships) should be used to transfer and recombine such knowledge (Burt, 1992; Granovetter, 1983; Hansen, 1999, 2002). Weak ties prevent risks of cognitive lock-in, since the firm remains at arms' length from others. More structured relationships are however necessary to transfer the complex knowledge, which includes tacit insights, interpretations and heuristics, entrenched in individual experiences and context-specific routines (Becerra et al., 2008; Easterby-Smith et al., 2008; Polanyi, 1966). Complex knowledge is thus *sticky*, and recipients need to spend time and efforts to absorb new information (Szulanski, 1996; von Hippel, 1994). This suggests that firms should get close to organizations struggling with knowledge search, and help them through training and socialization tactics (Hansen, 1999; Inkpen and Tsang, 2005; Van Wijk et al., 2008). Alternatively, the firm can select privileged 'partners', and keep others at arms' length. The selection is based on benevolence-based trust and competence-based trust, i.e. trusting that the knowledge source wants to do good to the firm, and has the skills to search relevant knowledge (Levin and Cross, 2004; Phelps et al., 2012; Renzl, 2008).

2.3. Collaborative innovation with users

Studies on collaborative innovation with users acknowledge that firms can also relate to users. Some users are especially proactive, and engage with knowledge search to increase their customer experience and/or support firms' innovation processes (Greer and Lei, 2012; Lüthje and Herstatt, 2004; Von Hippel, 2009). These users demonstrate a capacity to develop expert and technical knowledge, and share their findings with firms (Hienerth et al., 2014; Von Hippel, 2009). In particular, previous research remarked the importance of lead-users, i.e. users "who face the same needs of the general marketplace but face them