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The Construction of 'Communities of Practice' in the Management of Innovation

Abstract   *Communities of practice have been identified as playing a critical role in the promotion of learning and innovation in organizations. Yet, while innovation may be facilitated within communities of practice, radical innovations frequently occur at the interstices across communities. Here, the performative advantages of communities of practice are less clear. Moreover, while it has been suggested that managers play a critical role in constructing, aligning or supporting communities of practice, there is little empirical evidence for these assertions. This article contributes to these debates on the construction of communities of practice and their role in the innovation process. It does this through a case study of a radical innovation for the treatment of prostate cancer. The case focuses on Medico—the company that manufactured a product for the new treatment—and explores attempts by managers to construct a new 'community of practice' as a vehicle for innovation. While the case highlights attempts by managers to construct communities as 'social objects', it also underlines the shift in management strategies and practices associated with such a construction. Faced with powerful professions, and limited organizational support, managers employed a strategy centred on constructing a community focused on the disease (rather than the product) using 'community of practice' as a rhetorical device to enrol key professionals and to mobilize and legitimize changes in work practice. Thus community building reflected managers' lack of power to intensify innovation by other means.* **Key Words:** *communities of practice; innovation; knowledge; networks of practice; power*

The notion of 'community of practice' has achieved prominence in the context of wider debates on knowledge, learning and innovation in organizations. It has played a crucial role in highlighting the extent to which knowledge and learning are situated in work practices and has provided an important counterpoint to

alternative views focusing, more narrowly, on the role of cognition. A community of practice is defined as

> an activity system about which participants share understandings concerning what they are doing and what that means in their lives and for their community. Thus, they are united in both action and in the meaning that that action has, both for themselves, and for the larger collective. (Lave and Wenger, 1991: 98)

A defining feature of communities of practice (as opposed to, say, project teams) is that they are seen to emerge spontaneously from the (largely informal) networking among groups of individuals who have similar work-related activities and interests (Lesser and Everest, 2001; Lave and Wenger, 1991; Wenger, 1998). Organizations are depicted as embracing multiple and heterogeneous communities of practice, and communities of practice may span organizations (Brown and Duguid, 2001a).

These characteristics of spontaneity and freedom from organizational constraints lead authors to link communities of practice positively to learning, knowledge flows and innovation (Brown and Duguid, 2001a; Orr, 1996). Evidence in support focuses on the ways innovation emerges incrementally from local adaptations of work practices within communities, in response to new problems (Brown and Duguid, 1991). However, it has also been noted that, while communities of practice may encourage the flow of knowledge and innovation within communities, they may limit the knowledge flows across communities and, therefore, can place constraints on innovation at the wider organizational level (Brown and Duguid, 2001a). In particular, radical innovations often occur at the interstices across established groups and work activities (Blackler, 1995)—they are radical precisely because they disrupt or fundamentally alter current work practices (Clark and Staunton, 1989). Established communities of practice may, then, pose problems for the development of radical innovations that cross such communities.

These observations about the possible advantages and constraints posed by communities of practice have led proponents to focus on the ways in which they may be exploited more effectively for organizational advantage. Thus it has been argued that organizations can play a critical role in constructing or supporting communities of practice, or in 'structuring spontaneity' (Brown and Duguid, 2001b). Recent attention has shifted, then, to the agentic role of managers in constructing, supporting and aligning communities of practice in order to exploit human capital more fully and to develop innovative capacity (Lesser and Everest, 2001). The result has been a growing tension in the literature around the question of the manageability of communities of practice. Critics argue that more recent accounts (see Wenger and Snyder, 2000) reflect a displacement of the emancipatory aspirations of the original notion by a preoccupation with improving prediction and control for purposes of improving performance (Fox, 2000; Contu and Willmott, 2000). References to hegemonic relations, power and alienation that populated the earlier discourse have almost entirely disappeared being, as Fox (2000) notes 'referred to in passing in the footnotes' (p. 857).

This article aims to inform these debates on the manageability of communities of practice and their role in innovation processes. It does this through an empirical account of an attempt by managers to construct a new community of

practice specifically to mobilize a radical innovation (brachytherapy) for the treatment of prostate cancer. This innovation entailed significant changes in medical and organizational practice, requiring different groups of medical professionals to work together in the delivery of treatment through new hospital centres. The article focuses on the management group in Medico—the company responsible for developing a product to be used in the new treatment. To develop and market their product, this group needed to enlist the participation of a wide array of medical professionals and other groups, including groups within their own organization. The article shows how management's response to this challenge rested on the reflexive appropriation of the notion of 'community of practice' as a means of overcoming both inter-professional barriers to the sharing of knowledge and professional resistance to commercial objectives.

The article aims to explore, then, not the workings of communities of practice per se but, rather, managers' attempts to construct a community in order to mobilize, develop and legitimize a radical innovation. In doing so, it highlights, first, the implications of communities of practice for the creation, diffusion and integration of knowledge relating to a radical innovation that cuts across professionally and occupationally bounded work practices. Here it identifies the role of communities and networks of practice both as barriers and facilitators to innovation processes (Brown and Duguid, 2001a). Second, it draws attention to the ability of managers to exploit 'communities of practice' as a rhetorical device in the pursuit of organizational objectives and the legitimization of new practices. Finally, it illuminates the practices of management in constructing, responding to, and living within, communities of practice.

Theoretical Background

Communities, Networks and the Innovation Process

'Communities of practice help foster an environment in which knowledge can be created and shared and, most importantly, used to improve effectiveness, efficiency and innovation' (Lesser and Everest, 2001: 41). Brown and Duguid (1991) argue that such communities are important arenas for local invention because they constantly improvise, adapting their behaviours in order to traverse the limitations of formal organization and canonical practice. Communities of practice are thus seen as critical to the sharing of knowledge within organizations—helping to explain the relative 'stickiness' or 'leakiness' of knowledge (Brown and Duguid, 2001a). Being at the interface of the organization and its environment, they are a source of innovation as 'the process of innovating involves actively constructing a conceptual framework, imposing it on the environment, and reflecting on their interaction' (Brown and Duguid, 1991: 53). Moreover, if organizations are understood to comprise multiple and differentiated communities of practice, then the main organizational task becomes one of 'coherence finding'—finding the most productive local experiments and insights and turning them into broader systems of organizational innovation (Brown and Duguid, 1991).

From this perspective, flows of knowledge are seen as inextricably linked to social relations developed through shared practice. Communities of practice exert

a crucial influence on the integration of knowledge required within innovation processes because they both emerge from, and shape, network relations (Lesser and Everest, 2001). Communities of practice help, then, to both constitute and constrain the inter- and intra-organizational networks through which knowledge is acquired, communicated and legitimized (Clark and Staunton, 1989; Robertson et al., 1996; Scarbrough, 1995; Aldrich and von Glinow, 1992; Ibarra, 1993; Tidd, 1997). Such networks may encompass both formal and informal social relations within firms. It is the construction of these intra-firm relations that is commonly the focus in studies of communities of practice. However, they may also encompass formal and informal relations that span different organizations. While such inter-organizational relations have been implied in the literature relating communities of practice to innovation and learning, they have rarely been examined empirically.

Occupational and professional networks are important inter-organizational forums for learning and innovation (Swan et al., 1999). These emerge, in part, through shared practice and a degree of convergence on valued activities, professional identities and behavioural norms (Drazin, 1990). Such networks are more than just loose coalitions, or market-based inter-organizational alliances. Indeed, it could be argued that they share many of the features associated with Lave and Wenger's original communities of practice notion, including (importantly) a social identity conferred through shared practice. That said, professions are not the same as communities of practice—they are bounded by formal institutions and governance mechanisms that control membership, for example.

Reflecting this distinction, professional and occupational networks are described by Brown and Duguid (2001a) as examples of 'networks of practice'—epistemic networks where 'practice creates the common substrate . . . [but] relations among networks members are significantly looser than those within a community of practice' (p. 205). Such networks are seen as critical to innovation because they allow the emerging local knowledge of particular groups to be accessible to others within the broader epistemic culture (Brown and Duguid, 2001a; Ziman, 1967). Thus 'similar practitioners, by virtue of their practice, are able to share professional knowledge through conferences, workshops, newsletters, listserves, web pages, and the like' (Brown and Duguid, 2001a: 206). Networks of practice are also deemed to play a critical role in creating and warranting knowledge by engendering shared identity. Identities, according to this view, exist at the level of practice and mediate between structured order and unstructured individuality. However, different networks of practice also produce distinctive epistemic cultures linked to their distinctive social identities. This means that, while networks of practice encourage the flow of knowledge within the network, they may simultaneously constrain the flow of knowledge across networks. For example, while scientists within disciplines can communicate and collaborate with colleagues globally, they may fail to collaborate across disciplines, even at a local level (Knorr-Cetina, 1999).

It follows from this that networks of practice, like professions, may have constraining effects on innovation processes that require the integration of knowledge across networks. In the main, however, the literature on communities of practice has trumpeted their positive role in organizational innovation. This is perhaps because it has tended to use examples of incremental improvisations in

practice (e.g. Orr, 1996). In contrast, radical innovations, by definition, fundamentally alter work practices—they require the embedding of new knowledge and work practices and, at the same time, the disembedding of old ones (Clark and Staunton, 1989). Such radical innovations frequently occur at the interstices of communities and networks of practice and rely on the integration of knowledge. This encompasses both the integration of new knowledge with embedded knowledge and the integration of the specialist and distributed knowledge possessed by a range of different groups, inside and outside the organization (McLoughlin, 1999).

To date there have been few, if any, studies that explicitly address the role of communities and/or networks of practice in such radical innovation processes. One aim of this article is to redress this gap. Studying radical innovation, we argue, can make an important contribution to debates about communities, and networks, of practice precisely because such innovation processes change work practice— they are implicated, therefore, in the construction of new communities of practice. Thus the analysis of radical innovation presented here may help to address concerns that 'communities of practice theory tells us nothing about how, in concrete practice, members of a community change their practice or innovate' (Fox, 2000: 860).

The discussion so far has suggested that radical innovations that cut across networks of practice pose significant management challenges in terms of the integration of knowledge. These are highlighted in our empirical study. However, the analytical issues in our case are not just to do with knowledge. The complexity of the management task, including the manageability or otherwise of communities of practice, is considerably amplified when attention is paid to the dynamics and unevenness of power relations embedded within and across networks. These issues comprise the second major theoretical strand of our analysis.

Power and the Manageability of Communities of Practice

Earlier studies of communities of practice conceptualized them as spontaneous forms of organizing and forums for learning. For example, Brown and Duguid (1991) stress that communities cannot be created in a top-down fashion, but that organizational structures and procedures should aim to preserve the 'healthy autonomy' of communities. These earlier studies also acknowledged that power inequalities between communities and the larger organization can jeopardize the free exchange of knowledge, even if they do not go far in addressing these inequalities (Fox, 2000).

In contrast, more recent work depicts a distinctive shift in the discourse of communities of practice, characterized by increasing references to their performative advantages and manageability (Contu and Willmott, 2000). Thus Wenger and Snyder (2000) suggest a number of advantages; they solve problems quickly; they transfer best practices; they help companies recruit and retain talent. Likewise, Brown and Duguid (2001b) offer specific recommendations for 'structuring spontaneity [sic] and taking advantage of incoherence' (p. 58). In relation to innovation, they note that 'enacting coherence' (and so turning local invention into organizational innovation) requires 'finding' and 'moving' requisite knowledge. There are two clear imperatives here for organizations wishing to innovate:

first, to support the development and circulation of knowledge within communities and, second, to pursue alignments across communities of practice.

This emphasis on aligning practices has led clearly to the implication (albeit often implicit) that there is a critical role for management, as coordinators of organizational activity, in supporting and constructing communities of practice. The management role shifts, here, from one focused on command and control to that of 'system builder'—facilitating and brokering the development and integration of knowledge within and across communities (see Hughes, 1987). A number of specific tools and managerial tasks have been suggested for this purpose. For example, managers seeking to align practice should engage in 'participation' (actively seeking out people who belong to more than one community and supporting them in knowledge brokering) and 'translation' (framing the interests of one community in terms of another's worldview—Brown and Duguid, 2001a). Prescriptive recommendations regarding the ways in which management might actively intervene in the 'autonomous' operation of communities of practice have also become increasingly common (Liedtka, 1999; Lesser and Everest, 2001).

Critics note how the appropriation of communities of practice within managerial discourse has been accompanied by the disappearance of organizational politics (Contu and Willmott, 2000; Fox, 2000). While a useful rejoinder to insidious managerialism, these debates have tended to focus attention on managerial intentions (viewed as either benign or manipulative) rather than actual practices. This risks, first, ascribing to an overly unified view of management as a uniformly powerful group in acting out their intentions and, second, neglecting the crucial distinction between the social practices of employees and those of managers. For example, the suggestion that firms can be understood as a 'community of communities of practice' (Brown and Duguid 1991), neglects the implications of the different forms of social practice in which different organizational groups (including management) are engaged. Here Harris (1980) makes an important analytical distinction between primary social practices, concerned with the production of goods and services, and secondary social practices, which are directed at the integration and coordination of primary social practices.

It follows that management needs to be viewed not as a monolithic, all-powerful, organizational actor but, rather, as encompassing a distinctive array of provisional, fragmented and sometimes contradictory practices (Reed, 1984; Tsoukas, 1994). In line with this, our analysis focuses on management practices, viewing power not as a commodity possessed by one group over another, but as a relational characteristic implicit in social practices themselves. In that sense, the knowledge and learning which are developed within and across communities of practice are both the object and the medium of power relations. As Townley (1994) puts it 'knowledge is not secondary, detached and independent, a source of illumination, but is integral to the system of administration and governance which it helps establish' (p. 16).

Viewing power as integral to managers' attempts to construct communities also helps to make sense of their interaction with professional groups or networks of practice, neglected in the current literature. Professionals involved in the development of innovations tend to be acutely aware of the implications for their control over particular knowledge domains—especially in relation to other professional

groups—and may thus become an important locus of resistance and conflict (Abbott, 1988; Drazin, 1990; Freidson, 1986). Drazin (1990) for example, questions the assumption that professionals are necessarily devoted to the pursuit and production of knowledge suggesting, alternatively, that their underlying motivations could be viewed as 'primarily ones of power, status, and access to and control over a knowledge domain' (p. 251).

These observations have significant implications for innovation. To the extent that this requires a redefinition of professional tasks, responsibilities and authority (as is the case with radical innovation) and/or is seen as relatively advantaging one professional grouping over others, conflicts of interest are likely.

> Innovation, then, can be seen as a political act, taking place within a network of partisan interactions, and invoked by professionals to advance, maintain or defend their claims to legitimate control over a professional domain. (Drazin, 1990: 252)

In cases of radical innovation in professional contexts, management faces considerable challenges in overcoming such conflicts. In such cases, the value to management of constructing (or attempting to) communities of practice engaged around the innovation may derive as much from their discursive role (in overcoming some of the problems created by the competing professional interests) as from their productive role (in the creation and sharing of knowledge). The possibilities for 'communities of practice' to play this discursive role are indicated by Gherardi et al. (1998) who note the 'reification intrinsic to the idea of "community of practice" . . . connoted by a sense of harmony, order and coherence with a positive, virtuous and consensual overtone' (p. 278). In the Medico case next, then, we explore the way in which 'communities of practice' might be used as a rhetorical device for overcoming some of the problems around the competing interests of different professional groups involved in radical innovation processes.

Fox (2000) observes a specific weakness in the way the communities of practice literature addresses power in its analysis of the learning process. To redress this gap, Fox argues that communities of practice theory could be informed by conceptions of power, as portrayed by Foucault (1984) and by actor network theorists (e.g. Callon, 1986). While acknowledging their different foci, in terms of time frames and levels of analyses, Fox argues that their common focus on concrete practices makes these perspectives complementary. In particular, actor network theory offers a set of concepts—based on Callon's 'sociology of translation'—that help to explain learning and change within and, more importantly, *across* communities of practice (Fox, 2000).

While Fox's argument is illustrated through previously worked examples—like Lave and Wenger's (1991) study of US navy quartermasters—it is not supported by empirical analysis. Here, then, concepts from actor network theory (problematization, *interessement*, enrolment and mobilization) may be useful to frame our empirical analysis of managers' attempts to construct a community of practice. Unlike the communities of practice literature, which usually looks at relations within organizations, actor network theory focuses attention away from the organization as the unit of analysis and towards the wider fabric of network relations. It also emphasizes (as does Foucault) the productive and generative aspect of power used in concrete practice. This is particularly relevant for our case, where the innovation depends on mobilizing knowledge and commitment across a

range of professional and organizational groupings, and where power is relational. It also allows us to focus on management practices, not just intentions. Thus, in our analysis, we also focus on the various means that managers in Medico deploy in their attempts to weave across professional and organizational groupings (or networks of practice), and to persuade or seduce others to link up with their own intentions.

A Case of Innovation in Medico[1]

The unit of analysis for this case was the innovation process—referred to here as the Prostate Cancer Therapy (PCT) project. Data gathering took place during the initial one-year period of the PCT project and focused on semi-structured interviews with those Medico managers who were pivotally involved in mobilizing the innovation. They were interviewed formally at least twice during the period in order to get a sense of process. The focal group included a project leader, a project manager, a product manager, a scientific marketing manager, a marketing adviser and a clerical assistant. In reality, however, role definitions were blurred. Moreover, despite having management roles, the project team fused managerial responsibility with other professional expertise. For example, the scientific marketing manager had spent nine years as a general practitioner (family doctor). Collectively, then, the group possessed individuals with specialist knowledge across a range of professional domains (marketing, medicine, manufacturing, radiotherapy, oncology).

Sales representatives from Medico's European regions who were associated with the PCT project, and who dealt directly with various medical professionals, were also interviewed. These staff linked to the UK management team in a 'hub and spoke' arrangement but formally reported to their own (country) regional managers. Additional sources also helped to contextualize the data. In particular, we had conducted research in Medico over a period of some three years previously (on an unrelated project) and this provided important data on the Medico organization, and on the positioning of the PCT project within the wider business. Project members also attended workshops with the research team and provided project documentation. We recognize the limitations that our data sources place on our account of the role of the array of different professional groups involved in the innovation process. However, the data sources reflect our focus on the managers' attempts to construct (what they viewed as) communities of practice, rather than communities or networks of practice per se.

The Innovation Process in Context

Medico is a large multinational bioscience company with the major part of its healthcare business devoted to imaging products for medical diagnostics (e.g. radioactive isotopes for the cancer diagnosis). It is structured around functions (broadly, commercial and manufacturing) and decentralized regional divisions (across Europe and the US), with a major European hub in the UK. The PCT project began as a separate 'spin-off' to develop and market products across Europe for use in brachytherapy. Prostate cancer is traditionally treated with

prostatectomy (surgery) or radiotherapy (through body tissue to the tumour). Although the chances of a cure are high (if treated early), the potential secondary effects, particularly of surgical treatment (incontinence and/or impotence), can be debilitating. Brachytherapy is a radical alternative that involves implanting low-dosage radioactive 'iodine seeds' directly into the prostate to kill the tumour from the inside. The technique itself is not new—it was originally developed in the 1960s. However, the original method for implanting seeds (the Whitmore technique) was laborious, so scientific results were unreliable. In the 1980s, a new technique allowed seeds to be implanted under direct ultrasound visioning. This, coupled with the advent of computerized dose planning, gave much better results. Ten-year clinical trials data now show long-term survival rates to be as good as with prostatectomy, but with secondary effects greatly reduced. Moreover, Medico had developed a new product that incorporated iodine seeds directly into the suture for implanting which, they claimed, increased reliability further.

These technological breakthroughs were only part of the innovation process. It was only through practice in treating patients that the brachytherapy technique, and the therapeutic skills required (and, also, the Medico product), could be refined, further developed, and legitimized. This demanded radical shifts in the work practices of medical professionals. Unlike traditional treatments, which are based on either surgery or radiotherapy, brachytherapy encompasses *both* surgery *and* radiotherapy. This requires a cross-disciplinary approach to medical treatment—urologists and radiotherapists, as well as nurses and physicians, need to be involved in treatment decisions and delivery. As the Project Manager suggested:

> Urologists deal with prostate cancer. Radiation oncologists deal with radioactive materials. One of the barriers has always been that the urologists couldn't offer it [brachytherapy] by themselves, as opposed to surgery, and so there is always going to be a team—physicians, radiation oncologists and urologists.

This radical innovation thus cut across existing, professionally demarcated, medical practices, and depended heavily on the integration of knowledge across professional and occupational networks.

The strategy in Medico was to foster the establishment of multidisciplinary centres for brachytherapy within hospitals, involving urologists, radiation oncologists, physicians and nurses. As well as treating patients, these centres would act as sites for education and training of other medical professionals in brachytherapy practice. Through changing work practice in this way, a potential market for the Medico product (but also competitor products) could be established. This mirrored the approach taken in the US, where around 900 centres had been established, leading to commercial success for the Medico product. In Europe, legislation limits direct incentives for product use in healthcare, so commercial strategies were limited—Medico could not advertise the product, nor directly fund centres (which cost around $100,000 per hospital). Indeed, mass marketing could have proved counterproductive to Medico's reputation if public expectations were raised too high.

> Even if you have the ability, as we do now, to go all for patient drive, we wouldn't have the centres to treat them . . . if patients knew that they had it as an option, they would choose it (even if urologists did not want to offer it). It is a disease that always comes down to a patient choice. So we couldn't do a lot of press because people would get very frustrated. (Project leader)

Instead, their approach was to 'kickstart' the development of centres by providing and coordinating information, training and education in brachytherapy for medical professionals and other stakeholder groups (e.g. charities, and patient support groups). Reflecting this, around 95 percent of marketing budget was being spent on such activities.

Importantly, the PCT project operated outside Medico's mainstream business: 'It is a small area of the business that doesn't fit into the overall great mission statement' (Project manager); 'we have mostly diagnostics. Then you have this other product which is like an orphan product' (Scientific marketing manager). This meant that securing resources (including staff time) within Medico for the innovation was extremely difficult through formal channels. For example, the PCT project was coordinated, most unusually, from a UK-based team that had no formal power over the regional managers or sales staff:

> We don't have any power or weight over these people. The report line is such that we are always the ones asked to provide things and we can't ask them to provide us with anything. (Project manager)

To mobilize support for their project, then, Medico managers had also to mobilize commitment internally through largely informal means (outlined below).

The key characteristics of this innovation process, then, were that it was both non-linear and networked. The innovation cut across multiple networks of practice and needed to co-evolve with the development of the new cross-modality community that practised it. Medico's approach, then, hinged on facilitating the *gradual* development of a new community, embracing different professional groups (and staff within Medico), who were practising the treatment and could speak for its success. The major activities of the project team thus centred on aligning medical professionals and Medico sales staff with interests in prostate cancer, in general, and brachytherapy, in particular.

> The actual selling of the product is the easiest of all but the challenge is to persuade people to actually embrace brachytherapy as a treatment. (Project manager)

The Role of Communities and Networks of Practice in Radical Innovation

While the literature emphasizes the facilitating and harmonizing effects of communities and networks of practice on knowledge flows and innovation, in this case of radical innovation there were substantial constraints. These can be understood by addressing the unevenness of work practices and power relations across networks of practice. In particular, this new treatment potentially meant a significant shift in the balance of power over patient care between consultant surgical urologists (traditionally the more powerful group) and radiotherapists. Thus:

> there is quite a lot of resistance from urologists to the method because it is a method that directly competes with radio prostatectomy which is what they do . . . Also they are trained as surgeons and it is difficult for them to embrace a multidisciplinary approach when they have been used to being in charge of everything. There is a feeling that they will lose control over the patients which makes them not very responsive at first. (Scientific marketing manager)

Faced, then, with a potential erosion of their professional power, but also with clinical results in support of brachytherapy, urologists had tended to adopt a defensive stance.

> they say quite openly that 'if we don't start doing this we are going to have these patients taken away from us. We are not going to have any participation at all'. They are taking, not a very proactive, but a defensive position but they are getting interested in it and also the results speak for themselves—you can't get away from that. (Scientific marketing manager)

Conversely, brachytherapy was met with enthusiasm by the community of radiotherapists:

> radiotherapists have been very quick to embrace it with a few inspired urologists, let's say. Put it this way, a radiotherapist could actually do it without the urologist but the urologists can't do it without a radiotherapist … it's quite easy to convince a radiotherapist because it is a nice thing for them to do because it is one of the few treatments where they actually get a chance to cure a patient. It's curative whereas most of what radiotherapists do is planning for treatment so there is a feel good factor for them. (Marketing adviser)

The UK project team also battled against established work practices and formal structures within Medico.

> We are fighting ourselves as much as we are fighting the market out there … I often feel we are our own worst enemy in many ways. (Scientific marketing manager)

Medico management faced a situation, then, where more or less powerful, and sometimes competing, networks of professionals, and embedded practices, to some extent militated against the innovation. The UK team lacked formal authority within Medico and also faced suspicion among medical professionals over their commercial objectives.

The Management of 'Communities of Practice'

In spite of this difficult context, around 100 new centres for brachytherapy practice were established in Europe during the first 12 months. Market growth was so rapid that Medico had just decided to restructure, making therapy a major part of its business. Some key mechanisms through which this occurred are outlined next.

The Rhetoric of 'Community'

Medico management saw their major task as facilitating the construction of a new multidisciplinary community engaged around brachytherapy practice 'we need to create the community where they can work together' (Project leader). Recognizing that awareness of prostate cancer in Europe was low (early detection and survival rates are much lower than in the US), the major idea was to construct a community focused, first and foremost, on the *disease* and, second, on the brachytherapy technique. 'We have said that the disease is the most logical way for us to expand' (Product manager). This approach was persuasive because, although heterogeneous medical professionals had conflicting views on treatment, one thing they could agree on was the importance of curing the disease.

Critically, a discourse of 'community' was employed as a rhetorical device to mobilize support for community building. Thus the PCT project was described as being about 'collaboration, creating communities, engagement and cooperation, enabling choice of treatments both by the doctors and the patients' (Project leader). Metaphors of 'creating a stage' where medical professionals could act together and 'creating a shared sense of desire' were frequently employed by the project leader. The rhetoric of community played a critical role in allowing more naked commercial interests to live alongside a desire among medical practitioners and Medico staff to make a 'real difference' to the chances of survival and to the quality of life for cancer patients. This was central in engendering other patterns of activity that served to take the innovation forward.

The rhetorical strategy of a 'community of care' focused on the disease helped to provide a rationale for cross-disciplinary work and helped to mitigate inter-professional conflict (see Legge, 2002).

> The education focuses on the disease and also the role that different specialists could play, also respecting the politics within. It gets a bit tricky but I think we have helped hospitals because they want this kind of cross modality, multidisciplinary work. Our people have tended to be almost the fall guy for the need for them to get together. So it wouldn't be that a urologist or a radiation oncologist would have to 'break down'—we would say it's a multidiscipline area, a team approach and where it works well is where there is a good team. (Project leader)

The construction of a 'community of care' also coincided with the intrinsic motivational and career interests of individuals.

> Luckily most (of the doctors involved) are in high spirits—you could probably make a whole career on this treatment if you wanted to. For a lot of people this will be their launch. This will be their big impact on their medical speciality. (Project manager)

Being involved in a brachytherapy 'Centre of Excellence' (terms promoted by Medico) became, for some, an important aspect of identity construction. This extended to the project team themselves who, given their scientific and medical interests, saw the innovation as exciting and valuable. Thus Medico management were driven by commercial objectives, certainly, but also by a strong commitment to the treatment possibilities:

> It's a good treatment—something you can be proud to be associated with. (Scientific marketing manager)

Networking and Knowledge Brokering
The management practices of constructing a community hinged on networking and knowledge brokering. In keeping with Brown and Duguid's (2001b) observations, many of these activities were aimed at participation and translation. Reflecting the importance of networking, communication was described as the 'number one' priority:

> it's the make or break part of our business so we don't actually have a choice. (Project manager)

Within Medico, informal networking was used extensively to counter the political 'isolation' of the PCT project.

> It took us a lot to set up the channels through which we could politically or correctly across the company find a way to work together. (Project manager)

Face-to-face contact was often organized on the back of scheduled meetings that were likely to be attended by sales staff during their 'normal' line of work. But,

> it is still difficult—a sort of prodding and coaxing, and please come and we really have things that will benefit you. (Project manager)

Beyond Medico, networking centred on developing close personal contacts with key specialists across the heterogeneous groups in order to enrol participation in the community. Medico management spent a considerable amount of time cultivating 'opinion leaders' who would speak on behalf of the treatment (see Rogers, 1995). Some formal educational events were organized, but suspicion over Medico's commercial objectives meant it could be difficult to get participation.

> Medical oncologists don't even look up when you enter the room. I have literally had a sales conference where you have 10 seconds for what you have to say and then get out. (Sales rep)

To circumvent this, the project team and sales staff cultivated contacts by getting invited to events organized for other professional purposes (e.g. medical congresses, professional association meetings).

Knowledge brokering activities were many and varied. For example, a database (a 'speakers' bureau') was developed on key opinion leaders qualified to talk about the treatment. The scientific marketing manager was also recruited specifically with the remit of linking relevant medical professionals with scientific expertise on the disease, or 'boundary spanning' (Tushman and Scanlan, 1981). A large part of her time was spent reviewing, filtering and abstracting scientific papers on the disease and translating them into a form that could be more easily understood by medics and sales staff. Her medical background, she claimed, was critical, not just in providing relevant expertise, but also in establishing legitimacy

> It gives me great credence with the doctors obviously and enables me to speak to them on an equal one to one basis, which may not happen with non qualified people. (Scientific marketing manager)

Early on, Medico organized a weekend meeting (in an extremely luxurious setting!) for leading consultants in urology and radiotherapy. As a result, the specialists involved, wary of commercial funding, secured funding from their respective professions to form a new society to develop guidelines and professional standards for prostate cancer treatment. While this meant that Medico could not control content, the guidelines were essential for legitimizing brachytherapy in the wider medical community. This could be seen as an example of 'positive network externalities'—extending the network around the disease, so there would be a market for the product, also meant loosening control by opening up the network to possible competitors (Ciborra and Andreu, 2001). As the product manager noted:

> With this product you were developing the market to use your product and obviously, what comes with that as well is that you develop the market that your competitors sell into.

In the absence of formal structural power, Medico management used their network positioning to shape knowledge flows. For example, a public relations (PR) company was contracted to handle communication to the wider medical and

public community. This both brokered information and disguised commercial objectives.

> If we want to publish something we can't say it ourselves, we have to get a doctor to say it then we can quote them. We try to get people to say what we want to hear. (Product manager)

It was particularly important because Medico lacked legitimacy as a medical device company.

> We know a lot and can say a lot but we may not have access to the right channels. We are hindered by the status of the company—by the fact that it is not our expertise. (Product manager)

'Success stories' were also used, quite deliberately—formal meetings were held on the subject (see Lesser and Everest, 2001).

> Success stories are a really powerful tool. If you get someone to stand up there and say 'this is what works' it's a lot more meaningful that you getting up there and saying you need to do x or y. (Product manager)

Moreover, although the brachytherapy web-site was public and, therefore, 'open' to competitors, Medico management were on the editorial board.

> We just sponsor it but we will try and control it as much as we can, preventing the competition from putting too much into it but, of course, allowing it to be there to give it some credibility. (Project manager)

Discussion

The analysis presented here aims to inform two debates which, to date we argue, have not been sufficiently considered, or empirically supported, in the literature on communities of practice. First, we consider the role of communities of practice in radical innovation. Second, we consider the manageability of communities of practice, and management practices, in a complex, inter-organizational setting characterized by uneven, distributed power relations.

In addressing this first debate, the case has highlighted the way in which radical innovation demands changes in work practice—changes that cut across existing networks of practice and epistemic cultures (Knorr-Cetina, 1999). Brachytherapy, like other radical innovations, was potentially 'competency destroying' to some of the professional groups it affected (Christensen et al., 2000). Indeed, the threat it posed to the urologists' control over patient care and professional identity created significant initial resistance to its introduction. In addition, the innovation was hampered by the absence of any natural constituency for the treatment, as relevant networks of practice lacked any shared appreciation of brachytherapy. As a result, the innovation could only be advanced through a heterogeneous range of interventions mediated via the Medico team. First, support had to be mobilized for the innovation by aligning a wide range of groups, both externally and internally, then means had to be found of facilitating the flow of relevant knowledge across existing networks and communities of practice.

To promote the appropriate knowledge flows, the Medico project team employed a rhetorical strategy, appropriating the notion of the 'community of

practice' built around the disease. This rhetoric effectively acted as a 'boundary object' (Star and Griesener, 1989). In particular, it not only helped to forge coordinating links across networks and communities, but also facilitated new encounters between existing groups in the field. At the same time, Medico management were engaged in the process of constructing a new community of practice by developing social networks which were linked to the new medical and organizational practices required for the innovation. In this way, they sought to exploit both the performative qualities of the community of practice in relation to the sharing of knowledge, and its associated discursive qualities of consensus and solidarity in relation to the mobilization of commitment (Gherardi et al., 1998). The Medico case thus underlines the ability of managers to exploit the notion of communities of practice as a discursive device for the pursuit of business strategies and commercial objectives.

The case, however, also has important implications for our understanding of the sometimes paradoxical role played by both communities and networks of practice in radical innovations. We observe of the former, for example, that knowledge sharing *within* the community is counterbalanced by the boundaries that they place on the sharing of knowledge *between* communities. Moreover, as Brown and Duguid (2001a) have noted, while 'epistemic differences' between different communities may impede the development of innovations within the firm, extramural 'networks of practice' may greatly extend the scope of knowledge sharing outside it, thus enabling the externalization or 'fissioning' of the innovation (Zeigler, 1985). In the brachytherapy case, this pattern was evident in the management team's efforts to bypass the more recalcitrant regional sales managers, in order to enlist informally the help of the regional sales forces. Thus, in this case, the development of communities of practice was an important influence, positively as well as negatively, on the inter- and intra-organizational networks through which the innovation was diffused and implemented.

Turning to the second debate, on the manageability of communities of practice, here we observe the management team from Medico adopting a highly indirect approach. This does not conform well with existing models which tend to be narrowly framed by 'top-down' or 'bottom-up' approaches (see Wenger and Snyder, 2000). Thus the Medico team did not seek to construct a community through managerial diktat, but rather focused on appropriating the term 'community of practice' as a way of legitimizing wider changes in work practices. Thus, where other accounts emphasize the intentionality and political influence of management (e.g. Contu and Willmott, 2000), the Medico case, and particularly the managerial stratagems adopted in relation to communities of practice, tends to highlight managers' relative lack of power when confronting powerful professional medical groups such as urologists (Raelin, 1991).

The response of Medico management to the problems posed by radical innovation was instructive. Some of their attempts to broker knowledge across competing professional groups mirrored the Brown and Duguid (2001a) prescription—the knowledge brokering efforts of their public relations firm, for instance, or the role of the 'community of practice' rhetoric as a boundary object. On the other hand, Medico's interactions with, and dependence on, dispersed and heterogeneous networks suggests that actor-network theory (Callon, 1986) may provide a more powerful lens to interpret certain episodes in the innovation

process described here. This theoretical approach identifies four major episodes through which a network is brought into being and held together. Thus some of the Medico team's efforts can certainly be viewed as a process of *problematization.* Significantly, the problem was framed in terms of the disease and patient care rather than the brachytherapy treatment or the Medico product per se. This approach was adopted in order that all other sets of actors might recognize the problem as one that was shared. In addition, Medico engaged in *enrolment*— primarily through persuasion and inducements—in order to consolidate the roles and collaborative activities required of the various sets of actors. Persuasion strategies were primarily informational, and here the work of the scientific marketing manager was crucial in abstracting and translating scientific papers. Inducements took the form of the weekend meeting (in a luxurious setting) where developments in the treatment of the disease were discussed across disciplines. Finally, *mobilization* can be related to Medico's efforts to involve a group of urologists who were comfortable with the treatment and qualified to talk about it. These individuals were used extensively by the Medico team to disseminate information across professional groups, thereby generating commitment to the treatment.

It is a significant observation from this kind of analysis, however, that the Medico management took care not to be seen as an 'obligatory passage point' or to engage in what Callon (1986) terms '*interessement*'. Such activities would arguably have alerted key actors within the wider network—particularly relatively hostile urologists—to their commercial interests. The Medico management were key actants but also needed to cloak their actions within the network. The fact that they did not act as an obligatory passage point, and only indirectly mobilized allies and knowledge flows, thus seems to reflect their lack of power and the strategies they had to adopt in the face of powerful competing networks of professionals. Nevertheless, overall actor-network theory provides a useful heuristic here, reflecting both the embedded power within the network and the management team's relative lack of power.

The final element of our analysis extends this account of the networked dimension of managerial activity. On the one hand, it is clearly important to make the analytical distinction between management as a secondary social practice versus the secondary social practices of producer groups. The latter groups' work and social relations are actually the object of managerial activity (Harris, 1980). On the other hand, despite rhetorical usage and other stratagems, in this case we observed that the Medico management were incapable of making the community of practice a direct instrument of policy and control. Rather, managerial action was fragmented and sometimes incoherent. Managers were not able to stand outside the innovation process that they sought to direct. Such observations therefore underline the blurring of primary and secondary practices through shared activities in the creation and diffusion of knowledge. As Gherardi et al. (1998) note:

> knowledge, activity and social relations are closely intertwined, and in a sense the common activity provides the medium and resource for both the reflective linguistic act of generating a 'sense of community' and the inevitable conflicts and power struggles between those who know and those who don't. (p. 278)

Conclusions

This case highlights the multi-layered and networked nature of the interactions between managers and communities of practice within a radical innovation process. At one level, we have clear evidence of the concept of the 'community of practice' being appropriated as a discursive strategy by management. For the Medico team, this strategy helped to mobilize the innovation process around the brachytherapy treatment in three major ways. First, it enabled the innovation process to transcend existing professional demarcations and helped to neutralize professional conflict and resistance. The development of 'centres of excellence' helped to address both the medical (technological) and organizational elements of the innovation by fostering an inter-professional community based on a reconfigured practice. Second, it effectively aligned commercial interests with the broader values of the multiple, more or less powerful, medical professional groups whose involvement was central to developing and legitimizing the therapy, and therefore to providing a market for the product. Third, the notion of becoming part of a 'community of patient care' provided a strong intrinsic incentive for regional sales staff to get involved in an innovation project in a context where the UK project team had relatively little power in the allocation of extrinsic rewards (see Liedtka, 1999).

The efforts of managers in this case could be interpreted simply as an attempt to manage innovation by aligning the interests and agendas of competing professional groups in healthcare with the commercial objectives of the Medico organization. Through Medico's attempts to broker knowledge, a range of professional groups began to adopt the new brachytherapy practice, and this resulted in increased business for the Medico product. However, any interpretation based on material interests needs to be tempered by an appreciation of the implications that this innovation process had for both the practices of Medico managers and our theoretical appreciation of such practices.

In the first instance, the Medico case highlights the wider implications of the use of notions of 'community' as a rhetorical strategy on the part of management. The discourse of 'community of practice' was not separate from action here (Sturdy, 2002) but, rather, was entwined with activities and tasks associated with the development of cross-cutting networks of practice and the brokering of knowledge. In seeking to construct a new community of practice, the Medico management were not simply exploiting a sense of community for political purposes, but were actively engaged with it for the production of knowledge. Thus the secondary social practice of management was consciously intertwined with the primary practices of the medical professionals through networking and knowledge brokering activity. Indeed, the marketing of the product was undertaken, not through conventional means of sales and advertising, but through professional development and education.

Moreover, this shift in management's approach to innovation can be related to the networked nature of this innovation process and the institutional context in which the process unfolded. While the power of the medical professions reflected the highly regulated context of medical treatment, it also provided a means of managing innovation within that context. Conventional forms of product development and marketing would have been inappropriate here—not least because of

the risks of unregulated demand as identified by the Medico team. The focus, then, on the community of practice provided a controlled pattern of diffusion, in which the use of the 'product' could be linked to the necessary updating of medical knowledge and hospital arrangements for treatment. One consequence of this pattern of innovation was that the Medico team were managing a process which generated significant network externalities—creating further incentives to adopt an inclusive approach centred on professional development and professionally legitimized standards.

This is not to say that the Medico team's appropriation of community of practice was philanthropic. Commercial objectives remained the primary motivation. But, by fusing their business aims with the institutional legitimacy of professional development and improvements in medical treatment—working within, as well as on, the knowledge flows in the innovation process—managers defused the potential clash between business and professional values that a more overtly commercial approach would have created. Significantly, this externalization of their innovation into wider professional networks simultaneously enabled the Medico team to overcome the weakness of their position within the fragmented organizational politics of the firm. In particular, it helped to enlist sales staff and organizational resources that could not be commanded through hierarchical means. Thus the mobilization of external networks of professionals around the improvement of disease treatment can be seen as reflecting not only the political dynamics of the institutional context, but also the 'fissioning' of the innovation process in response to barriers in the internal context.

Overall, then, the Medico case highlights the shifting practices of managers when confronted by the demands of a radical, networked innovation process. Lacking the power to direct such a process, managers at Medico adopted, instead, the role of 'systems builder' (Hughes, 1987), working in an improvisational way across professional and organizational boundaries and sublimating their business motivations in the cause of community building. By acting in this way they were ultimately able to achieve a level of influence within the radical innovation process which might have been unattainable through more conventional means.

Note

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