

Managing innovation as communicative processes: a case of subsea technology R&D

Tone Merethe Berg Aasen
NTNU Social Research Ltd
Studio Apertura, 7491 Trondheim - Norway
Tel: +47 93059051
Email: tone.berg.aasen@apertura.ntnu.no

Stig Johannessen
Bodo Graduate School of Business
8049 Bodo – Norway
Tel: +47 92035007
Email: stigjo@bntv.no

Abstract

Exploration of the communicative nature of innovation processes and the impact of this on innovation management has largely been ignored in innovation research. This paper suggests that the adoption of a complex responsive processes perspective opens up for insight and implications that depart from the prevailing view of what it means to manage joint efforts for innovation in business organizations. A key contribution is the suggestion that a change of perspective on organizations from conceptions of “whole” to notions of joint human interaction implies a need to increase management attention to the detail of local interaction between people striving to construct meaning out of new and ongoing themes, for the company and for them. We base our claims on an empirical example, drawn on a longitudinal research initiative conducted in cooperation with the Norwegian petroleum company Statoil.

Keywords: complex responsive processes, innovation management, innovation processes, subsea increased oil recovery

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1 INTRODUCTION

Research on the phenomenon of innovation began to grow and proliferate in the 1960s, but did not truly gain momentum until about 20 years ago. Today, innovation is seen as the main enabler of long-term company viability, and is broadly recognized as being about thinking 'outside the box' (Borgelt & Falk, 2007). The comprehensive interest in understanding the innovation journey (Van de Ven, Polley, Garud & Venkataraman, 1999) has been accompanied by a concurrent interest in identifying the managerial moves necessary to ensure safe arrival at a predetermined destination (Davila, Epstein, & Shelton, 2006; Ettl, 2006; Goffin & Mitchell, 2005; Snyder & Duarte, 2003; Tidd, Bessant, & Pavitt, 2005). The results are ambiguous, but the apparent challenge of innovation management is to create an environment of perpetual innovation, where everyone is committed to excellence, resulting in growth and sustained competitive advantage. Another remaining idea seems to be that properly informed managers will be able to control the progress of innovation in such a way that the results will be, within defined limits, in accordance with some strategic intent.

This paper seeks to progress our understanding of what it may mean to manage innovation processes in business organizations. Drawing on a quadrennial research collaboration with the Norwegian petroleum company Statoil¹, and adopting the theory of *complex responsive processes* (Griffin, 2002; Shaw, 2002; Stacey, Griffin, & Shaw, 2000; Stacey, 2001; 2007), we have suggested elsewhere that the fundamental nature of innovation is *communicative interaction*, leading to evolving patterns of themes experienced as unpredictable and uncontrollable (Johannessen & Aasen, 2007). We have further argued that the communicative interaction can be seen as joint patterning processes of power and identity, influenced by everybody involved, although certain individuals always have a larger say (Aasen & Johannessen, 2007).

Our view of innovation as emergent patterns of themes evolving in the interplay between interdependent individuals has exposed a problem concerning established ideas of innovation management. From a complex responsive processes perspective organizational processes are joint human interaction, where individual and organizational characteristics evolve as two aspects of the same process. Human interaction is not seen to lead to any process-independent 'system', only to further communicative interaction. The management of such processes in organizations has been referred to as an activity "emerging in groups of interacting individuals engaged in collaborative action" (Tobin, 2005, p.67). This view brings to the fore a question whether one should expect individual managers to be able to design or even intentionally articulate a jointly desired generalized pattern, such as future organizational states or guidelines for collaborative behaviour.

In this paper, we discuss some of our experiences as participants in a comprehensive Statoil R&D initiative for increased oil recovery, emphasizing what we see to be important, yet traditionally overlooked aspects of innovation management. Our key findings, which are discussed in section 6, are the consequence of purposive reflection on own experiences in Statoil as well as on accounts of various events given by company members. Before we go into the discussion, we provide a brief review of the established literature on innovation management, and of the distinguishing features and the methodological orientation of the complex responsive processes perspective. Next, we will present the specific research approach, and the *Subsea Increased Oil Recovery* case. In conclusion, we outline some of the possible practical implications of our findings, and suggest a direction for further research.

2 PERSPECTIVES ON INNOVATION MANAGEMENT

Industrial leaders encourage innovation based on expectations of improved business performance. Nevertheless, such processes are more often than not met with opposition, possibly because development and adoption of novelty also involves risk. Examination of various contributions within the field of innovation management leaves an impression that the main challenge of innovation management is the simultaneous handling of demands on *profitability*, seen as a necessity for company short-term survival, involving cost control, workforce reduction, efficiency, and value-chain optimizing; and *innovation*, seen as essential for long-term viability, involving creativity, experimentation, uncertainty, and the risk of failure (e.g. Ettl, 2006; Tidd et al.; 2005; Trott, 2005). The complexity of this challenge is emphasized among others by Tidd (2001), who has made a comprehensive review of current research on innovation. He points out the random unpredictability of

¹ The examples provided in this paper are derived from a study concluded in September 2007. The references are therefore made mainly to Statoil, and not to StatoilHydro, which was formally established on 1 October 2007, following a merger.

innovation and the diversity of research approaches as the main reasons that knowledge about innovation management still appears to be incoherent and difficult to translate into clear prescriptions.

We find that recent literature on innovation management brings into focus three particular areas of management responsibility, which are *organization*, *competition* and *value realization*. The main objective of *organization* focused innovation research is to identify organizational characteristics promoting company innovativeness (e.g. Arad, Hanson, & Schneider, 1997; Ravichandran, 2000; Siguaw, Simpson, & Enz, 2006). The intention is to generate knowledge which managers can implement into their organization so as to increase general innovative capacity. Researchers focusing on *competitive conditions* analyze decisions seen to be of strategic importance, cooperation and alliances, selection of markets and market strategies, and areas for innovation. This research involves the view that managers can choose a strategic approach to innovation dependent on available resources and the competitive context (e.g. Grant, 1991; Teece, Pisano, & Shuen, 1997).

The third area, which we refer to as *value realization*, includes research focusing on factors having impact on the outcome of innovation processes (e.g. Durand, 2004; Neely, Fillipini, Forza, Vinelli, & Hii, 2001). In this context, organizations can be seen as actors which create and take ownership of value (Wijnberg, 2004). The realization of value as the outcome of innovation processes is related to the ability of a company to convert new knowledge, scientific breakthroughs, and technological advances into economic success. This view has engendered vast interest in theories of organizational learning (Nonaka & Takeuchi, 1995), collective knowledge (Glynn, 1996), knowledge management (Quinn, Anderson, & Finkelstein, 1998), communities of practice (Wenger, 1998), and indeed, innovation management (Davila et al., 2006; Tidd et al., 2005; Trott, 2005). Furthermore, the effect of collaborative processes on innovation and business performance is discussed by several researchers (Cohen & Levinthal, 1990; Durand, 2004; Tsai, 2001; Chesbrough, Vanhaverbeke, & West, 2006).

Although the defining feature of processes of innovation is pointed out to be complexity and uncertainty (Tidd, 2001), most authors hold on to assumptions of management controllability of such processes, justified by the observation that many companies survive and renew over time (Tidd et al., 2005). As distinct from most researchers, Van de Ven et al. (1999) point out that managers at many hierarchical levels are involved in the management of innovation, and that in spite of a widespread view that managers have a uniform, common perspective; managing innovation does involve diversity and conflict. Accordingly, their suggestion is that innovation processes may be inherently uncontrollable and that a relaxation of “traditional notions of managerial control” (p. 66) is needed. In this paper we address the problem described by Van de Ven et al. (ibid.), by adopting a *complex responsive processes perspective* as the theoretical basis.

3 THE COMPLEX RESPONSIVE PROCESSES PERSPECTIVE – DISTINGUISHING FEATURES AND METHODOLOGICAL IMPLICATIONS

As will be further described in section 4 and 5, our research situation was highly participative. Implicitly, a theoretical perspective focusing on “real time” human interaction was demanded. The basic idea of the *complex responsive processes* perspective, which is the perspective adopted in this study, is the importance of taking the experiences of human action and interaction seriously (Stacey, 2001; 2007). The distinguishing features of this perspective are that all human relating is seen as fundamentally communicative, and that ideas of the autonomous individual and the objective observer/manager are replaced by assumptions of the simultaneous social construction of group and individual identities (Stacey, 2007). The methodological position is that of reflexivity in both individual and social terms.

An important source of inspiration of this perspective is Elias (1978; 2000). He argued that even if people do plan and do have intentions, they inevitably also participate in figurations of interaction in which power is always an intrinsic property. He saw such figurations of power to be asymmetric, meaning that individuals influence the communicative interaction they are part of to a greater or lesser extent. Elias therefore suggested a non-linear, paradoxical, transformative causality between human action and the outcome of social processes. The non-linearity means that even small variations in themes have the potential to lead to radical global re-patterning of conversations and power relations, sometimes referred to as the ‘butterfly effect’ (Lorentz, 2000). For organizations, this should mean that conflicts between actions, plans and purposes of interdependent people leads to repetition and change as aspects of the same process, and that this is essential for novelty to emerge and evolve (Leana & Barry, 2000). Elias’ view could therefore be seen as an opportune reminder that human nature makes it improbable that one individuals’ plan or intention should become dominant as the long-term reality of everybody in the organization.

The methodological orientation of the complex responsive processes perspective is grounded on the thinking of George H. Mead (Stacey & Griffin, 2005). Mead saw human social life as perpetual movement, emerging in responsive processes of negotiation and reality constructions. He argued that mind, consciousness, self-consciousness and society are reflexively co-constituted through communicative gesture and response cycles of meaning-making, in which individuals relate and act in cooperative-conflictual interdependencies with other people (Mead, 1967).

Elias and Mead shared the view that reality is seen to develop because of social interaction. In consequence, the source of creativity and innovation lies in the transformative potential of the continuous mutual adjustments of meaning between people doing whatever they do during their working days. Note that from this perspective people are always seen to be in practice, and practice is experienced through participation. Furthermore, experience is understood as *personal experience* of interaction. Consistent with these ideas, the present study was carried out with an explorative attitude referred to as *emergent participative exploration* (Christensen, 2005). The term *emergent* is conceptualized to represent the formation of meaning for the participating researcher from the exploration of one activity or situation. The emerging meaning then guides the suggestion of the next activity of exploration, as well as the development of specific themes appearing to be of particular relevance to the situations explored.

Characteristic of this approach is the connection made between research and identity, implying the view that researchers, as participants in organizational everyday life, influence the processes studied. Even more importantly, it is assumed that the researcher may change in the same process. Emergent participative exploration therefore shows similarity, but also distinct differences, to action research (discussed e.g. by Williams, 2005). In our view, emergent participative exploration can be seen as the researchers' intent of experiencing everyday social processes in organizations, rather than being about a particular method. This means that we see it appropriate to apply different qualitative methods as we know them traditionally, as part of the process of developing new meaning.

4 RESEARCH APPROACH

In connection with the establishment of six strategic research and development (R&D) programs in Statoil in 2003/2004, an idea had developed among a few managers in the Technology division that one of the programs, called *Subsea Increased Oil Recovery* (SIOR), provided a good starting point for evaluation of their internal processes for innovation. The four members of the SIOR core team (CT) accepted the presence of a researcher as part of their team, and so the first author of this paper was invited to join them. She was engaged in Statoil for four years, and granted an ID card, the opportunity to work on-site, and to access internal databases, e-mail system and intranet. The study lasted from January 2004 to October 2007, but the collaboration with StatoilHydro is still ongoing.

The study mainly involved participation in ongoing formal and informal meetings and conversations intended to lead to innovation in Statoil, but also interviews, consultative intervention and studies of written material. As an implication of the research situation, our view of innovation management in Statoil is primarily based on experience from the Research Centre. We were, however, given the opportunity to interview leaders and workers in all the business areas involved: *Technology & Projects, Exploration & Production Norway*, and *International Exploration & Production*, many of them holding key positions. This gave us the opportunity to evolve and challenge our impressions of ongoing company activities for change and innovation, including managers' contributions to these processes. The respondents interviewed were persons recommended by our main contact persons in Statoil. In addition, we included persons we met during the study who, assumingly, would help us broaden our perspective on Statoil innovation processes.

Examples from the SIOR program are described and analyzed by use of a narrative style. The narratives are based on three kinds of input, which are the *factual story* about evolving events, *individual stories* offered in conversations between the first author and Statoil members, and finally, *own reflections* about experiences as SIOR program participant. The SIOR program made a very rich case, and in the process of going through notes and memories, we intentionally picked out and composed stories to support the communication of our present understanding of the innovation processes we were part of. Our analysis could therefore be seen to be our understanding of the particular and general themes discussed by people we spoke to. A key objection to this research, as it may be to all participative research methods, is thus the biased subjectivity of the approach by which the results are obtained and presented. In line with Peller (1987), we argue that in the end, research results always depend on the subjective choices of the researcher about what to do, how to do it, and how to interpret, analyse, and present the material. The analytical method used is that of intentionally

reflecting on the details of one's experience of organizational processes, as basis for new insights and practices.

5 STATOIL AND THE SIOR CASE

The Norwegian oil and gas company StatoilHydro is the leading operator on the Norwegian continental shelf (NCS). With its modest 29,000 employees (current numbers), it is a relatively small company compared to its competitors². The conditions on the NCS have, however, made extreme demands on technology. This has led to the recognition of the company as a world-leader in the use of innovative technology, and brought it to the position of being the world's largest operator of deepwater fields. According to their web-site (www.statoilhydro.com), StatoilHydro aim at sustaining long term profitable growth through increased international activities and renewed efforts on the NCS. The latter scope is connected to an objective to increase oil recovery, but also to a necessity of avoiding the hidden threat of having to close down fields which are becoming unprofitable.

Compared to the previous, comprehensive field developments, recent NCS fields are smaller, and present value estimates leave little time and money for technology development. Still, the need for innovation is as pressing as ever. This has promoted a demand for increased collaboration within the company to develop new technology and work processes across business assets. As most StatoilHydro projects and operations are also conducted in cooperation with other companies, the management of development activities in the company by and large implies managing collaborative teams composed of people from various internal departments, and from one or more external companies.

The strategic R&D programs initiated in the Statoil Research Centre 2003/2004 were seen to be an important measure to promote the renewed efforts on the NCS. These were umbrella programs intended to embrace and adapt ongoing research activities according to program ambitions, as well as to frame new initiatives. The SIOR program was granted an annual budget of about 25 million Euros. The objective of the program was to provide technology making probable the increased production of oil from existing and future Statoil operated subsea fields on the NCS from the 2003 average of 43% to an average of 55% in 2008. This would mean the production of about 1.4 billion barrels of extra oil over the estimated lifetime of the fields, corresponding at the time to an added gross profit of about 70 billion US\$. This ambition was judged to be unattainable through the use of existing technologies, and implied the need for accelerated development and testing of technologies in the pipeline, as well as for the generation of completely new concepts.

As no single concept could meet the 55 % SIOR ambition, the program eventually embraced about 25 different development activities, spanning technology connected with the identification of drainage points and intervention needs, improvement of production management, provision of low cost drainage points and intervention, reduction of well head pressures and increase of liquid handling capacity. The activities involved more than 100 persons, of whom about half were employed in other companies. A core team (CT) of four hand-picked people was composed to manage the program. All of them were experienced managers and specialists having worked many years in Statoil operational units, and representing different disciplines within petroleum engineering.

Few SIOR activities were started from scratch. Work had been ongoing in the Research Centre and in other parts of Statoil for a long time, aiming at the development of various technologies to render possible the recovery of increased volumes of oil. The experience of those involved, among them future members of the SIOR core team, was that it was hard to attract attention towards this kind of initiatives in the company, and that it generally did not result in anything. The idea of framing individual projects having similar intentions into an umbrella program with an overall ambition was therefore launched as an attempt to direct the top management's attention towards the potentiality of such activities, and to facilitate communication about them in the company. The approach appeared to work, as the SIOR ambition gradually got fully backed up by the top management.

6 INNOVATION MANAGEMENT AS ACTS OF PARTICIPATION

The basic idea of the SIOR program was that the combination of operational unit requirements and the creative capabilities of Statoil researchers and specialists, and experts from other companies, would lead to the generation of new technologies tailored to enable the increased efficiency of subsea oil production. Statoil was taking on the dual role of customer and technology provider, assigning the role

² In comparison, Shell employs 108,000 people, Chevron 56,000, Total 95,000, and BP 97,000.

of provider to its Research Centre. The argumentation was in line with Thamhain (2003), who claims that the hallmark of capable R&D teams is that they generate innovative ideas, but also “transfer newly created concepts through the organizational system for economic gain” (p. 297), and with von Hippel (2005), who asserts the importance of user-centred innovation. The program was characterized by the assignment of a specified, measurable end target, and the diversity of technology developments needed to succeed.

SIOR was, however, also about the introduction and implementation of new ways of working in the company. The most important of the change initiatives was the top management expectation about closer cooperation between Statoil researchers and members of operational units. Until then most of the larger development projects had been performed in collaborations between Statoil operating unit members and external suppliers, and the role of the researchers in these projects was generally seen to be modest. The authorization given to SIOR members to take a leading role in business development was therefore seen as unusual, and was referred to as a “different way of working”. In this particular case, then, innovation management was not only about managing technology development, but also about preparing for the adoption of new technology elements by Statoil-operated fields, as well as bringing it all about through approaches to collaboration which in several ways were unfamiliar to the persons involved. In this section, we address key findings related to this versatile task, seen from the perspective of complex responsive processes. The findings are illustrated in Table 1.

Table 1: Key issue and key findings of research

Key issue	Method	Key findings
Assuming that innovation is communication processes, what does it mean to manage innovation in business organizations?	Emergent participative exploration	<p>a) The principal task of innovation management is participative actions intended to influence emerging patterns of themes, to support the collective movement towards a desirable future situation</p> <p>b) Innovation management involves dealing with various phenomena of group dynamics, including insider/outsider relations. Top management support and the attribution of credibility to the innovation manager from involved parties are important supportive factors.</p> <p>c) Innovation management is the courageous, continued exploration of experiences of being together in spite of potential conflicts. This involves the acknowledgement of paradox, and of the simultaneous need for sustained pluralism and widespread joint meaning.</p> <p>d) The idea of management participation is on a collision course with predominant management ideas. of planning, predictability, control, and monitoring</p>

Managing phenomena of group dynamics

A common objection among operational unit members to the leading role in innovation given to the Research Centre was that they understood better the business challenges facing Statoil than did most of the researchers. Although most acknowledged that there were a lot of excellent niche experts in the Research Centre, operational unit members also meant that they were better trained as project managers. From their side, several of the researchers expressed a view that neither members of the SIOR CT, nor of the operational units, fully appreciated that inventing technology was somewhat more complicated than to “sit down and just decide to get a break-through”. In some cases, this seemed to lead to a clash of interests which constrained cooperation between members of the operational units, and the researchers. However, the full support given to the SIOR program by the top management appeared to pressure the involved parties to exert themselves so that activities progressed.

In line with Van de Ven et al. (1999) we observed that the differences between the members of the Research Centre and the operational units were also reflected among the managers. Partly because of this, the role of the SIOR CT members gradually evolved to be that of *technology broker*, or intermediary between development and adoption processes. We were told that this was a new role in the company, judged to be very important for the realization of the SIOR ambition. The SIOR CT

members' knowledge of current business processes appeared to provide the credibility among operational unit managers that was not attributed to many of the researchers. The reputation of the head of the SIOR CT as an experienced and able manager was particularly important, and opened doors to persons and meetings of great importance to SIOR. On the other hand, from our position it seemed that the former experience of the SIOR CT members made them somewhat less accepted by members of the Research Centre.

The preceding elaboration suggests that research attention should be directed to the theme of identity in groups, experiences of inclusion and exclusion, and the quality of relations. Mead (1967) claimed that 'we' identities in groups are based on generalisations. As 'we' identities develop, simultaneous perceptions of 'them' evolve, resulting in a paradoxical dynamics of inclusion and exclusion of individuals. Such activities, which will always be part of the process of forming and identifying with a group, are accompanied by the tendency to label groups of people in ways that enforce the difference between 'us' and 'them' (Stacey, 2007). This tends to leave us with an impression of the uniformity of group characteristics. Hence, what people produce when they interact in the living present could be seen as the continuous creation and recreation of individual-group identity. In line with our experience, Elias and Scotson (1994) argue that raising issues of 'us' and 'them' relationships can uncover insider and outsider relations in which diverse groupings develop or damage their cooperation. Correspondingly, Stacey (2007) points out that power differentials between groups may create a powerful dynamics in organisations, probably constituting one of the main reasons for the failure of attempts to realise strategic intents. Seen like this, the task of the SIOR CT members could be seen to be the re-patterning of the experience of identity among people involved in SIOR, with the intention to enable new ways of working together.

Managing emerging patterns of themes

The SIOR CT members were continually participating in meetings and conversations, sometimes involving two persons, sometimes twenty. They kept repeating the 55 % ambition, but at the same time they spoke of specific technology elements, such as *Light Well Intervention; Wet gas compression; or Shared Earth modelling*, and about the business opportunities related to the adoption of such technologies by the various NCS fields. In concurrence with this, they made contact with Statoil information associates, who they educated by inviting them to relevant expositions and meetings. They also made sure that the top managers were always provided with the latest SIOR presentation material. After about two years it was commented in a core team meeting that they had been talking so much about the SIOR technologies that people in other petroleum companies started to implement them before Statoil did. Gradually, what emerged in the wake of this intensive communicative effort was a widespread opinion in the company that the 55 % ambition and the activities performed as part of the SIOR program were appropriate.

Our finding is that the ideas of the SIOR program was formed by various interests, but at the same time gradually formed, and transformed, the interests of those who in some way were engaged in the activities. This is in accordance with a perspective on organizations as patterns of interactions, where ongoing processes are influenced by many individuals in many roles, deliberately and unconsciously. It also supports one of the core ideas of the complex responsive perspective, which is that meaning is not determined by a gesture (like a statement or a move), but by the responses brought out by that gesture (Stacey, 2005). This leads to a cyclic movement of further gestures and responses in which meaning is formed, and power relations and senses of identity and meaning potentially affected. Implicitly, when people attempt to design or change some global pattern, like 'us' and 'them' relationships, they are doing nothing more than making a gesture, although this can be a very powerful gesture (Elias, 2000). What is emerging, are patterns of responses that no one individual could have decided, and that may involve the experience of novelty. It is, however, not given that the emerging patterns are perceived as 'suitable' or 'successful'. We see this as a particularly important point, which is rarely taken into account when innovation processes are discussed.

This further underlines a problem attached with the idea that innovation can be predetermined by the actions of particular individuals, such as managers, and emphasizes the intrinsic collective nature of innovation processes. At the same time, it indicates that individual and joint experiences of meaning and identity are found, and alters, in the ordinary, everyday conversations between people at work. In our view, this emphasizes the need to increase management attention on the detail of local interaction between people striving to particularize the significance of new and ongoing themes for the company and for them. Accordingly, the present rather one-sided focus on management acts as the development and following-up of steering documents and key performance indicators should be replaced by the recognition of the potentially even greater significance of management as acts of participation. Two points should be attached to this claim. One is that, as participants in the social processes of organized

life, managers should be regarded as free, and at the same time constrained, in choosing their own actions. Secondly, the actions they decide will expose their colleagues and subordinates to both possibilities and constraints.

Innovation management as disturbance and stabilization

The enabling constraints intrinsic in all human relating and the dynamics of inclusion/exclusion created between groups indicate that paradox is an inevitable part of such everyday interaction. We see the experience of paradox as being of particular importance in relation to innovation, which inherently entails the introduction or emergence of novel ideas. This means that reproduction of currently stabilized themes is disturbed, and so it is reasonable to expect that novel ideas may be perceived as controversial. This may cause uncertainty and even conflict between individuals and groups who incline towards re-establishing habitual patterns of themes, and those who pursue the new ones. Shifting experiences of identity and difference, inclusion and exclusion, inspiration and anxiety, freedom and control, and of structures of power, are likely to cause enthusiasm with some, and doubt and resistance with others. Such processes should not be seen to approach a mature or final state, but as being continued by individuals participating in local, everyday interaction, perpetually creating and recreating ideas about their intentions and possibilities.

While much of the existing management literature is about punctuating paradoxical situations, for example by recommending the introduction of unambiguous, measurable ambitions and objectives, our view is that managers should rather seek to capitalize on the pluralism which is the inherent property of paradox. Innovation can be found nowhere but in the emerging patterns of themes, which spread out and evolve because people take part in many local conversations. On the other hand, the intrinsic challenge of organizational achievement is the need for coordinated action between many people, and such collaboration depends on the production of “emergent, coherent, meaningful patterns of interaction both locally and population-wide at the same time” (Stacey, 2007, p. 434). Our findings indicate that in the myriad of ordinary, local meetings, themes are reiterated and sometimes transformed. This may enable joint action, or inhibit it. We therefore suggest that innovation depends not only upon the emergence of novel patterns of themes, but also on the diffusion and temporary stabilization of the evolving patterns among people whose cooperation is needed to render possible the enactment of the new themes.

Consistent with this idea, the continued intention of the SIOR CT members was clearly to bring locally evolving patterns of themes under the sway of the SIOR ideas in such a way that the decisions made by field directors or others whose actions affected the program activities were in favour of the realization of the SIOR ambition. A problem frequently discussed was how to ensure this. As expressed by one of the CT members: “The problem is not the conversations I am part of, the problem is those conversations in which I am not a part”. His experience was that patterns of talk emerging in his presence did indeed change as they were further evolved in conversations between other people, and not always in ways seen by him as favourable.

According to Fonseca (2002) pluralism in conversation is of vital importance for innovation. He further suggests that this pluralism is experienced by humans as *misunderstanding*. By misunderstanding he seems to mean the lack of joint meaning, leading to the continual shift and evolvement of the patterning processes of new themes because of the current introduction of new themes and ideas into the emerging patterns. Fonseca argues that the continued disturbance of emerging thematic patterns of experience may prevent premature or unwanted stabilization of themes. We see this interpretation of misunderstanding as a support to our observation that innovation emerged from prolonged communicative processes characterized by conflict, ambiguity and persuasion. In consequence, innovation management involves the courageous, continued exploration of the experiences of being together in spite of potential conflicts. On the other hand, tolerance for the kind of misunderstanding described by Fonseca (2002) appeared to be relatively low in meetings between SIOR members and people working in the operational units. A widespread expectation in Statoil seemed rather to be that the particular intention of the SIOR CT should be the enabling of controlled movement towards a desirable future organizational state.

Another experience was that the frequent introduction of new themes made by the Statoil top management and by other people in managerial positions represented a diversion of attention in the company from the SIOR ambition towards competing tasks and ideas. In consequence, the re-stabilization of the SIOR idea through the repeated communication of possibilities and promising results appeared to be an aspect as important for innovation success as was the maintenance of ambiguity.

A problem with participation

Prevailing management values, placing emphasis on efficiency, monitoring, control and short-term profit (Miles, 2007), seemed to be highly esteemed in Statoil, even in connection with processes referred to as innovation. In addition, the top management appeared to be inspired by the principles of value based management (Black, Wright, Bachman, Makall, & Wright, 1998). Among other things, this implied the introduction of prescriptive statements and visionary themes intended to direct the attention of company members towards specific objectives, like the need for innovation. Given the current view of the significance of innovation for business prosperity, it is no surprise that people in executive positions are prone to the temptation of subjecting innovation processes to the same procedures for strategy and control as other business processes. Moreover, the dominance of research ignoring phenomena of group dynamics and non-linear, time dependent effects of action involves that managers are offered models of organizational processes that do not and cannot capture the temporally embedded accounts that enable them to understand how emerging and evolving patterns come to be.

The current management expectation about performance measurements appears to be in opposition to our view of innovation management as the purposeful participation in communicative interaction. In Statoil, there seemed to be a never-ending demand for various kinds of project documentation. Although this was emphasized to be a problem by several of the managers engaged in SIOR activities, because it meant that they often had to leave their subordinates to their own devices, most seemed to accept the situation. Only a few openly said that they prioritized communication with their subordinates, to help them particularize the generalized project ambitions into their specific situations, and also to encourage people to communicate face to face about new ideas, within and across disciplines. "They need to see themselves in all the 'us'", one of these managers pointed out. The dilemma she and others faced when they focused on participation was that this kind of action was not "visible" in the company; their individual level of achievement could not be measured. Given the predominant management thinking in Statoil, they therefore felt that they were not really recognized as leaders by their superiors.

Paradoxically, it seemed that while what the SIOR members largely wanted was management attention towards their professional skills and challenges, the top management gradually tightened the demand for proofs of control, such as accounts and forecasts. This suggests that a question of particular interest is how decision makers think about their intentions when they are suggesting propositions and even orders, and of the possibilities and limitations of using target setting, planning and monitoring as basis for long-term organizational performance. From our perspective, the introduction of prescriptions and visionary themes are indeed important tools in the process of leading, and can be seen as factors contributing to the creation of meaning, but not as contributors to the achievement of control. Rather, mechanisms for structure and control should be seen as non-responding, response provoking tools, causing organizational members to feel enabled, but also constrained by their implications, depending on situation.

Our experience was that the actions following the introduction of the 55 % ambition emerged as the outcome of interplay between rules, plans, intentions, and choices, and were primarily patterned as narrative themes, affected by and affecting ongoing and emerging patterns. Management attention towards the challenges and needs of persons engaged in development projects clearly stimulated and supported innovation efforts. Based on this, we see the principal task for managers of innovation to be explorative and participative actions intended to inspire and motivate, but also 'force', the members of an organization towards the joint creation and realization of an imagined future, concurrently guided by the insight that the future is unknowable. Accordingly, management inclination to focus on general values and on control and monitoring of development processes could be seen as a disregard for the significance of participation as a management tool in innovation processes. The issue should rather be what purpose prescriptive and visionary formulations serve, what the emerging patterns of communication in ordinary everyday organizational life in response to such formulations are, and how we can understand innovation processes as being a part of this.

7 IMPLICATIONS OF RESEARCH

Our experience in SIOR demonstrates that company members are influenced by innovation; yet will influence the processes, consciously or unconsciously, at the same time. Therefore, innovation is a collective achievement, and, implicitly, a collective responsibility. This means that innovation managers should pay attention to individuals' possibility to go on together in the face of the paradoxical dynamics of conflict and cooperation characterizing innovation processes. An issue in this is the need that managers engage in conversations about the apparent tension between demands for efficiency and for innovation, and about the influence of their own actions on ongoing and emerging

innovation processes. In our view, the complex responsive processes perspective basically offers the opportunity to reflect on the manner in which people are reasoning as one of many aspects of human action in organized life, instead of taking rationality for granted. For managers, this means the possibility to take seriously their own experiences as leaders by focusing on what they actually do, and not on what they did or plan to do. Accordingly, we suggest that management team members may profit from spending more time in joint reflection not only about how to solve technological problems and meet with measurable business targets, but on own relevant everyday experiences, to explore what these experiences may mean to their individual and joint possibility of and capacity for innovation. Similarly, increased awareness of approaches to explore, clarify, and possibly develop emerging patterns of themes among innovation process participants appears to be a valuable investment of time.

Although preliminary, the results of the present study encourage continued exploration of the complex responsive processes perspective as an alternative way to research and explain processes intended to lead to innovation in companies. The principal objective of future research should be to extend our understanding of human interaction related to the development and exploitation of innovation in and between commercial companies and other organizations, to learn more about communicative aspects salient in innovation processes, and how these are enacted in different contexts. The objective is to understand better how such processes can be managed and supported, and to explore alternative approaches to describe innovation in terms of profitability and growth. We see individual and joint processes of particularization and functionalization of generalized ideas to be of particular research interest, because these processes are prerequisite for managers to be able to enact innovation in ordinary, local interactions in the living present. Accordingly, researchers' attention should be on issues and aspects emerging from the responsive processes of relating between people, in which thematic patterns caused among other things by considerations related to profit, politics, safety and reputation, but also to technology, physical environments, as well as habit, intertwine and evolve in unpredictable ways.

8 CONCLUSION

Drawing on a 4-year engagement in Statoil, we have discussed important aspects of innovation management, seen from a complex responsive processes perspective. Our study was carried out in accordance with the ideas of emergent participative exploration. We bring to the fore a view that innovation processes involve widespread movement of thought, which are changes in action. Implicitly, management measures of presence and support should be focused more than measures of control. Our suggestion is that innovation management is participative actions intended to influence emerging patterns of themes, to support the collective movement towards a desirable future situation. Our findings indicate, however, that the idea of management participation is on a collision course with predominant management ideas of planning, predictability, control, and monitoring.

Innovation management can be seen as the courageous, continued exploration of experiences of being together in spite of potential conflicts. This involves the acknowledgement of paradox, and of the simultaneous need for sustained pluralism and widespread joint meaning. It also involves dealing with various phenomena of group dynamics, including insider/outsider relations. We find that top management support and the attribution of credibility to the innovation manager from involved parties are important success factors.

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