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Meeting up for management control: bracketing interaction in innovation development

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Abstract

Purpose – The purpose of this paper is to examine meetings as a form of meta-practice and investigate their role related to management control of innovation development.

Design/methodology/approach – This research draws on case studies of two biotechnology firms operating in pharmaceuticals and medicine, which represent different contexts regarding the uncertainty and complexity of innovation development.

Findings – The study suggests two distinct roles of meetings in the context of innovation development: meetings as regulating and ordering; and meetings as a resource. In the first role, meetings serve as a regulative mechanism that brings together multiple elements of control into a system. Meetings as a meta-practice regulate and order by bracketing elements of innovation in time and space, rendering the innovation process more manageable and allowing actors to handle the complexity of knowledge. In the second role, meetings are used as a resource, sporadically intervening in the ongoing activities of innovation projects. The study explains how these two roles relate to the uncertainty and complexity of innovation development and have different implications for management control.

Originality/value – The study challenges the instrumental view of meetings by taking a closer look at their structuring potential in the organization. Understanding the roles of meetings provides another perspective on the functioning of management control and opens new avenues for studying the practices of control and decision-making.

Keywords Incremental innovation, Radical innovation, Meetings, New product development, Management control

Paper type Research paper

1. Introduction

Much of the earlier literature on management control and innovation has focused on whether management controls have an effect in innovation settings (Abernethy and Brownell, 1997; Bisbe and Otley, 2004; Brownell, 1985; Davila, 2000; Hayes, 1977; Rockness and Shields, 1984, 1988). As this has now been amply demonstrated (Cardinal, 2001; Chenhall and Morris, 1995; Cooper and Slagmulder, 2004; Davila, 2000; Davila *et al.*, 2009a;

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Davila and Wouters, 2004; Henri, 2006a; Hertenstein and Platf, 2000), the question is no longer *whether* there is an effect, but rather *how* management control systems are used in the development of innovation. Therefore, recent research has taken a deeper look at how these effects come about and how management controls contribute to innovation (Jørgensen and Messner, 2009, 2010; Mouritsen *et al.*, 2009; Revellino and Mouritsen, 2009, 2015; Taipaleenmäki, 2014).

Studies providing detailed accounts of innovation development have shown how management accounting and controls allow directing actors' attention and mediate between product development and general concerns of the firm (Jørgensen and Messner, 2010; Mouritsen *et al.*, 2009; Nixon, 1998; Revellino and Mouritsen, 2015). In particular, the literature has shown that developing an innovation requires more than an isolated use of a single tool or a few technologies but rather an assemblage of controls (Revellino and Mouritsen, 2009), and many sources of information, where financial and operating performance measures are combined with strategic planning, budgeting, and stage-gate evaluation systems (Jørgensen and Messner, 2009, 2010). The application of multiple controls allows for balancing complex and sometimes competing demands in the innovation process (Henri, 2006b; Jørgensen and Messner, 2009; Revellino and Mouritsen, 2009), while a combination of traditional and more dynamic forms of controls aids in responding to higher degrees of uncertainty (Chenhall and Moers, 2015).

Although the literature has shown how multiple controls take part in the development of innovation, we do not know much about the means through which they are brought together and enacted. The question concerns the mechanisms or structures through which management controls may have an effect in the organization. Jørgensen and Messner (2009) refer to such mechanisms as *meta-practices* and suggest a stage-gate evaluation system as an example of such practices, as it allows organizing other practices and tasks along the stages of innovation development. Such meta-practices or structures are usually established for a longer period, and they function by organizing and reflecting on other practices (Gunnell, 2003; Messner *et al.*, 2008) and, therefore, potentially shaping the way multiple other practices, such as planning, budgeting, or performance evaluation, are used in the organization. Jørgensen and Messner (2009), for instance, show how the stage-gate evaluation system functioned as a meta-practice by structuring the relationships between tasks and therefore establishing different expectations for the control aimed to be achieved at different points of time. Much of this effect stemmed from the ability to mark the path of innovation with scheduled meetings, where continuous informal interactions and information exchanges alternated with more formal discussions of each project.

We argue that this structuring ability of meetings is largely unexplored and deserves more attention to understand the mechanisms through which management controls are enacted in the organization. Attention to meetings as a meta-practice is relevant because meetings form a particular arena for ordering the organization and its interactions (Hendry and Seidl, 2003; Jarzabkowski and Seidl, 2008). Meetings have an ability to arrange other types of interaction (e.g. casual encounters, individual talks, and text) and decision-making in time and space. They form specific types of organizational encounters that are episodic, have an organizational purpose and involve the discussion of multiple parties, enrolling some actors and topics while leaving out others (Boden, 1994; Jarzabkowski and Seidl, 2008).

The focus on meetings is also valuable, as detailed organizational accounts on accounting and managerial practices have shown that much managerial work takes place through talk and interaction rather than merely going through accounting reports (Hall, 2010; Preston, 1986). Face-to-face interactions and meetings are part of managers' "practices

of informing" and analyzing events in the organization (Preston, 1986). Much of the discussion on accounting reports and figures in ambiguous and uncertain contexts can take place in meetings (Goretzki and Messner, 2016; Mack and Goretzki, 2017; Vaivio, 2006).

Therefore, the present study aims to study further the role of meetings as a meta-practice and investigate how the practice of meetings relates to the use of management control in innovation development. This is investigated through case studies of two small biotechnology firms operating in the pharmaceutical and medicine fields, whose activities involve different degrees of uncertainty and complexity (i.e. depth and diversity of knowledge) in innovation development. We analyze the role of meetings in these settings, drawing on the concept of episodes from Luhmann's (1990, 1995) theory of social systems and the works of Boden (1994), Hendry and Seidl (2003), and Jarzabkowski and Seidl (2008) that describe meetings as involving a particular process of *bracketing* that distinguishes such interaction from other activities of the organization. The notion of *bracketing* is relevant in understanding how meetings can function as a meta-practice. It refers to the mechanism through which meetings allow for arranging organizational interaction in time and space by temporarily detaching actors and topics from ongoing activities and communication in the organization and placing them in a separate arena of discussion.

The present study adds to the literature by showing how this mechanism is used in the context of innovation development and relates to management control. The results of this study show that meetings can have two roles in the context of innovation development: as a means of regulating and ordering the innovation process and as a resource. In the first role, meetings bracket the elements of innovation in time and space, rendering the innovation process more manageable and allowing actors to handle the complexity of knowledge in this process. In this role, meetings tie multiple elements of control into a system and allow integrating heterogeneous elements of innovation into a process that can be followed. In the second role, meetings remain mainly instrumental. They are used as a resource, rarely forming a stable system but sporadically intervening in the organization's ongoing activities. In this role, meetings and management controls denote rather informal practices spontaneously mobilized in response to the rhythms and needs of innovation projects. The study explains how these two roles relate to the uncertainty and complexity of the innovation process and have different implications for the management control of innovation development.

The remainder of the paper is organized as follows. Section 2 provides an overview of the theoretical perspective adopted. Section 3 describes the research method and the empirical settings of the study. Thereafter, Section 4 shows how two biotech firms, DrugCorp and TestCorp, use meetings and how these relate to the management control of the innovation process. Finally, a concluding discussion is provided in Section 5.

2. Theoretical background

2.1 Meetings and management control

The term management control refers to a set of techniques and procedures that are used by managers and other members of the organization to help ensure the attainment of organizational objectives (Bisbe and Otley, 2004; Flamholtz *et al.*, 1985; Otley *et al.*, 1995). These can involve information gathering, planning, accountability and feedback mechanisms, assisted by measures of performance (Flamholtz, 1996; Lowe and McInnes, 1971). Importantly, there are techniques and procedures of management control – that may go well beyond financially quantifiable information and formal tools in the context of innovation development (Bart, 1991; Chenhall and Moers, 2015; Davila, 2000, 2005; Davila *et al.*, 2009a) – and the practices through which they have an effect in the organization

(Ahrens, 1997; Ahrens and Mollona, 2007). One of these practices is the so-called *meta-practices* or structures through which other practices may be performed and reflected upon in the organization (Gunnell, 2003; Messner *et al.*, 2008). These practices, usually established for a longer period, inform the way several different tasks are performed in the organization. They have a less direct effect on organizational processes and individual tasks than management controls, as their main characteristic is their indirect nature and relation to other practices in the organization (Jørgensen and Messner, 2009). Besides examples of stage-gate evaluation systems, job-rotation and broader routines of critical reflection studied in the existing literature (Jørgensen and Messner, 2009; Messner *et al.*, 2008), this study looks at meetings as a particular form of meta-practice that can provide an important means of structuring the organization by arranging tasks and organizational interactions in time and space (Boden, 1994; Jarzabkowski and Seidl, 2008; Schwartzman, 1989, pp. 216-219).

Research on management accounting and control has provided various insights on the role of meetings in managerial and organizational encounters. Much of the management accounting and control literature has taken a perspective that Jarzabkowski and Seidl (2008) call an *instrumental view* of meetings, typically seeing meetings as serving the needs of specific tasks, such as analyzing reports or solving a problem. While often not central to an analysis, meetings are considered an inevitable part of organizational interaction and shaped by choices of administrative structures and other management controls. The use of meetings is, for instance, said to be promoted by an interactive use of performance measurement (Henri, 2006a; Simons, 1995a; Tuomela, 2005) or budgeting (Chong and Mahama, 2014) that stimulate more active dialogue and information flow in the organization. The data produced from such systems are suggested to act as "a catalyst for an ongoing debate" (Simons, 1994, 1995b, p. 87), suggesting that the design of a control system induces organizational interaction and possibly increases time spent in meetings. In this instrumental view of meetings, accounting and management control techniques are perceived as central structures through which meeting practices evolve.

Several studies have taken a closer look at practices in specific meetings. While not questioning the instrumental function of meetings, these studies focus on meetings as providing a specific setting in which "things" take place as, for instance, where accounting information is collectively interpreted (Goretzki and Messner, 2016), accounting numbers gain persuasiveness (Goretzki *et al.*, 2018), accountants' and organizational members' roles and accountability become questioned or established (Ancelin-Bourguignon *et al.*, 2013; Lambert and Pezet, 2011; Mack and Goretzki, 2017), or information and knowledge become integrated in the organization (Ditillo, 2004, 2012). These effects become possible as meetings entail the coming together of multiple participants and allow communicating a wide variety of interpersonal messages within a rich social context.

A few implications can be drawn from the literature about the structuring potential of meetings. While not central to their main argument, some studies imply a possibly more active role of meetings in structuring tasks and working practices in the organization. For instance, in the theoretical study by Malmi and Brown (2008, p. 294), meetings are considered part of organizations' governance structures, suggesting that "Meetings and meeting schedules, for example, create agendas and deadlines which direct the behavior of organization members." Much of this effect can be seen in observations of managers' and accountants' work, where scheduled meetings affect their self-discipline and the organization of tasks to cope with the increased pressure of accountability posed by upcoming meetings (Lambert and Pezet, 2011; Roberts *et al.*, 2006). The effect of scheduled meetings on participants' tasks can also be recognized in the analysis of monthly planning meetings by Goretzki and Messner (2016), where participants of the meetings needed to

make an effort to arrange and prepare reports prior to each discussion. These effects can further be related to the formality of meetings and their inner structures, as it is shown, for instance, that the emphasis of accounting measures in meetings adds to their structuring and disciplinary effect (Vaivio, 2006). That is, the structuring effect of meetings is co-produced with the accounting techniques used.

More detailed accounts on the effect of meetings on management control can be found in Abrahamsson and Gerdin (2006) and Jørgensen and Messner (2009). The case study by Abrahamsson and Gerdin (2006) in an equipment manufacturing setting investigates productivity meetings where notes of productivity were regularly reviewed and discussed with accountants and shop-floor workers. The results of the study imply that the regularity of and systematic approach to these meetings may have contributed to the accountability and expected behavioral changes of shop-floor workers. A more detailed analysis of the role of meetings as structuring organizational interaction is reported by Jørgensen and Messner (2009) in a case study of new product development, in which meetings had a central role in the stage-gate evaluation system. In their study, scheduled meetings intervened with the normal flow of interaction and decision-making, structuring the tasks of engineers (switching between routine and non-routine tasks) and imposing a more global visibility and control at certain points in innovation development.

In summary, these studies consider that the process or setup of meetings may influence what takes place prior to and during the meetings, having the potential to shape the tasks of participants and the way management control has an effect in the organization. In this paper, we look further at the role of meetings in the organization, that is, how they function as a *meta-practice* and relate to the use of multiple controls. The study aims to develop a better understanding of how the structuring aspects of meetings function and possibly affect the use of management control. The next section provides the basis for the analysis of meetings in this study.

2.2 Meetings in organizational analysis

Meetings can represent an object of analysis in various ways. Meetings can be studied in terms of how they are used, what outcomes they have, and how they shape and are shaped by individuals and other organizational structures. One particular feature makes meetings interesting for research on management control: their relation to the other activities and structures of the organization (Boden, 1994). Meetings and meeting structures can serve as a form of a meta-practice as they arrange other tasks and organizational interaction in time and space. Meetings are also interesting because they represent a more formal type of interaction compared to other types of talk and casual interaction, to the extent that they are planned for a given purpose, involve multiple participants and have a defined place and time (Boden, 1994; Jarzabkowski and Seidl, 2008; Schwartzman, 1989).

To investigate the structuring ability of meetings, we need to look at the episodic, patterned and recurrent nature of meetings (Boden, 1994, p. 79). For this, we follow the studies by Hendry and Seidl (2003) and Jarzabkowski and Seidl (2008), who use the concept of an episode to theorize meetings as a form of social interaction. The concept of episodes comes from Luhmann's (1990, 1995) theory of social systems. In this theory, Luhmann (1986, 1990, 1995) describes communication or utterances of movement, speech and/or writing as the basic elements of all social systems. Meetings can be understood as episodes that have three critical aspects: initiation, conduct and closure. *Initiation* is the point at which an episode is bracketed out from other ongoing organizational processes and becomes distinguishable as a separate event. The *conduct* of an episode refers to the flow of the activities within it – the ritual elements and discursive strategies used in the discussion. The

closure of an episode is the point at which structures of a meeting are dissolved, and everyday organizational life resumed. The present study looks primarily at the initiation and closure of episodes that particularly relate to their scheduling and to the extent these organizational interactions are pre-arranged. Moreover, the study is interested in the initiation and closure of episodes for their implications to the process of *bracketing* through which meetings interfere with the ongoing activities and structures of the organization.

The *initiation* of an episode encompasses not only the point when an episode is considered to start but also the ways meetings are planned or emerge in relation to other events and structures of the organization. The rhythm and agendas of other activities in the organization determine the purpose, value, and the timing of meetings (Boden, 1994, p. 83). Episodes can be routinely arranged on a periodic basis (e.g. weekly or monthly meetings) ahead of their actual occurrence or spontaneously as a routine response to particular circumstances (Hendry and Seidl, 2003; Luhmann, 1990). How this patterning takes place is closely related to other management systems and tools in the organization, as meetings represent a form of relational practice that creates "organizing spaces," while "these spaces are themselves often spaces for organizing other spaces" (Haug, 2013, p. 711).

Besides being closely related to other activities of the organization, the initiation of an episode is especially relevant for how *it takes participants away* from ongoing organizational activities (Luhmann, 1990). An important feature of meetings is their ability to make individuals stop everything else they might be doing (Kieffer, 1988, p. 11). This involves the mechanism of *bracketing* through which meetings sort out time and space – some organizational interactions become structured by a schedule and located in specifically designated places, e.g. meeting rooms (Boden, 1994). Luhmann's (1990) explanation of the initiation of an episode also marks the point at which the structures for the activities within the episode are established, setting a certain level of expectations about the participants and issues involved. In this way, bracketing delimits organizational interaction not only in time and space but also in terms of the topics and actors involved – selecting some issues while neglecting others (Boden, 1994, p. 80).

In addition to forming expectations for an episode, such bracketing entails an ability to create a certain distance to the ongoing activities and affairs in the organization. Luhmann (1990, p. 17) describes this as a reduction of complexity – "a creation of indifference to the many to enable an observation of the particular" [1]. Meetings allow actors to focus on some agendas and affairs of the organization, while suspending others (Boden, 1994). Meeting participants suspend their usual working environments "to enter a new one, with its specific problems, roles, and procedures [. . .] allowing participants to reflect on their environment" (Thunus, 2016, p. 3). This bracketing is further reinforced by the dependence of meetings on various written documents, such as pre-formulated written agendas, illustrations, and texts participants prepare and are required to read (Svennevig, 2012).

The *closure* of an episode is interesting in terms of how it relates to other agendas and routines inside and outside the episode, and how the decisions made during the episode are expected to have an effect on things outside the episode (Hendry and Seidl, 2003; Jarzabkowski and Seidl, 2008). According to Luhmann (1990), the closure of an episode can be based on its goal orientation and/or time limitation. The end of a goal-oriented episode is defined by the achievement of a specific goal (e.g. deciding upon an investment) or the realization that the goal is impossible to achieve (e.g. due to a lack of information for a decision). A time limitation simply marks the end of an episode in time. Thus, the closure of an episode generally relates to the organization members' agreement on the fulfilment of a condition to end the bracketing of ongoing organizational processes.

In this way, organizational interaction becomes pre-structured and temporally restricted as the point of initiation sets the beginning and the agreement on closure sets a "more or less pre-defined" ending (Hendry and Seidl, 2003, p. 180). Such interaction can continuously reproduce itself depending on how the episodes are connected; in other words, how one episode connects to later episodes, reproducing the system of organizational interaction (Hernes and Bakken, 2003; Luhmann, 1995). There is always a degree of structuring of "people, places, and agendas in such a way that it becomes clear who are the appropriate participants, which topics may be raised, etc." (Bergqvist *et al.*, 1999, p. 90).

In the following sections, we analyze the organization of meetings in two environments with distinct degrees of uncertainty and complexity in the innovation process – the latter involving a great depth and diversity of knowledge and the pluralistic as well as ambiguous requirements in the development of innovation. The managers' choices and preferences of scheduling meetings are interpreted considering the characteristics of each environment. The next section describes the research method and the empirical setting in more detail.

3. Research method and empirical setting

The two case firms, called DrugCorp and TestCorp for the purpose of this study, operate in the fields of pharmaceuticals and medicine. The activities of DrugCorp involve drug discovery and development, while the operations of TestCorp involve the development of diagnostic tests. This empirical setting allowed studying the role of meetings in two different contexts considering the particular characteristics of each type of innovation (see Table I for an overview). Even though the technologies used in these firms are highly complex, the innovation trajectories and the patterns of interaction and decision-making are still reasonably understandable for outsiders. This allowed the researchers to follow the progress of the innovation projects and the use of management control over a nine-month period, from September 2005 to June 2006 (with a short follow-up in 2009).

Data were gathered from interviews, observations, and internal documents of the firms. The main source of data was interviews, all conducted on the firms' own premises (Appendix 1). Interviews were considered sufficient since the study is not primarily interested in interactions during meetings and their unfolding (compared to Goretzki and Messner, 2016, for instance), but managers' preferences regarding the *initiation* and *closure* of meetings. Accordingly, the data collection was largely directed at managers' choices and justification for using meetings over other organizational encounters. The data collection focused on the position of meetings among other activities of the organization – how meetings bracketed other "things" in and out, and how the actors perceived meetings, that

Characteristics	DrugCorp	TestCorp
Broad industry definition	Pharmaceuticals	Medicine
Date of establishment	mid-1990s	mid-1980s
Size (no. of employees)	~25	~25
Products/objects of commercialization	Drug concepts	Rapid diagnostic tests for fertility, allergies, and other conditions
Activities	Research and development of drug concepts (radical innovations)	Manufacturing of diagnostic tests; development of new technologies for diagnostics (radical innovations); development of new tests (incremental innovations)

Table I.
Overview of the two case firms

is, the relevance of meetings to their work and activities concerning innovation projects. Many interviews were scheduled immediately after the relevant meetings and discussions took place, allowing us to follow the issues in these firms' laboratories and research and development (R&D) departments while they were still hot. The time frame of the study allowed for a reasonably long period of contact to investigate the firms' ongoing processes and to discuss several issues from their emergence to their solution.

Some visits included short observations of office interactions, lunches with managers and employees, and plant tours during which additional insights were gained. The 26 interviews conducted yielded almost 30 hours of discussions, of which 25 hours were fully recorded and transcribed. Several discussions were also held informally without the tape recorder running, covering a range of topics from the participants' educational backgrounds and experiences to areas of challenges and conflict in the firms, shedding light on the ways in which people interacted and made decisions in the organizations. The focus of interviews and case analysis was not merely on general constructs and replication but also on becoming familiar with the rich context and unique patterns of each case (Dyer and Wilkins, 1991; Eisenhardt, 1989). While the case organizations had similar sizes and both operated in the field of biotechnology, their innovation activities involved rather different degrees of uncertainty and complexity of knowledge. These differences were reflected in the data collection and the analysis of the specific challenges the interviewees described.

To diminish observer-caused bias, the emerging patterns in the case studies were repeatedly challenged from different angles, comparing the evidence from multiple interviews and documents. For instance, when analyzing the performance evaluation procedures of a product development project, we simultaneously considered interview data from a performance evaluation meeting, the internal reports discussed, and the memos produced by the meeting participants. The collected internal documents consisted of performance reports, meeting memos and records, reporting instructions, performance evaluation spreadsheets and e-mails. As to limitations of the study, the empirical evidence about meetings at TestCorp is less extensive than at DrugCorp. This is mainly a reflection of the managers' response to the lower degrees of uncertainty and complexity in that setting – the less rigorous use of scheduled meetings in managing innovation in TestCorp. In other words, DrugCorp's detailed system and the higher number of meetings led to more material to be obtained with regard to the main concept of the study.

Regarding the tools for data analysis, Atlas.ti software was applied to organize and analyze the case data. No automatic coding was applied; instead, coding was performed through reading and analyzing the meaning of the texts. The codes were post-defined as they emerged during data collection and analysis (Miles and Huberman, 1994, pp. 61-62). The codes were organized into families and networks according to the role of meetings and management controls that emerged during the study. The ideas that emerged from coding were captured with memos linked to the codes and quotations from the text. Memos allowed formulating and revising the emerging theory throughout the study (Corbin and Strauss, 1990, p. 10). Observational, methodological, and theoretical notes were separated to allow the original data to be "as uncontaminated by interpretation as possible" and to be reused if necessary (McKinnon, 1988, p. 46).

4. Case studies

4.1 DrugCorp

DrugCorp is a small biotechnology company, operating in the biopharmaceutical sector. The firm's business model involves discovering new candidate drugs and developing them until clinical proof of concept, with the aim to license them to pharmaceutical companies.

DrugCorp's innovation development could be considered to be highly technology driven, following the technology-push model common in the pharmaceutical industry (Petrova, 2014). Innovation activities of DrugCorp belong to the category of radical innovations, which usually involve the development of new technologies for relatively unknown markets (Dewar and Dutton, 1986; Ettlie *et al.*, 1984; McDermott and O'Connor, 2002; O'Connor, 1998). Drug discovery and development involve an extreme level of technological, market, and regulatory uncertainty (Bergeron and Chan, 2004; Rothaermel and Deeds, 2004). The process can take 2 to 20 years or even longer to complete, while the rate of regulatory approval to enter clinical trials is as low as 0.1 per cent of applications (Bergeron and Chan, 2004). However, a successful firm with a strong patent can potentially gain exclusive rights to an entire class of drugs, and the innovation of a single new molecule can bring billions of dollars in revenue for a pharmaceutical company, and the royalties for patent holders, such as DrugCorp, can be significant.

In addition to high degrees of uncertainty, the activities of DrugCorp involve high levels of complexity in terms of applying in-depth and diverse (i.e. from multiple domains) knowledge. The work of DrugCorp involves a team of professionals in the disciplines of molecular biology, computational drug design and medicinal and parallel chemistry and contracts with external institutions and groups of researchers in northern Europe and the USA. The academic partners and colleagues perform specific tasks to purify cells and acquire additional information about the possible application areas of drug candidates. At the same time, multiple electronic tools and databases are involved in recording the combinatorial chemistry used to synthesize a number of compounds for further analysis. Several activities need to happen in parallel; some completed within DrugCorp, and others by contract institutions. As the strategy of the firm was to make pre-agreements for licensing the drug candidate to pharmaceutical companies already during the clinical trials, then simultaneously with the laboratory tests of compounds, actions were initiated to commercialize the drug concepts, aiming to find established pharmaceutical companies interested in the drug candidates. At the same time, patent taking and trademark activities needed to be carried out.

The activities of DrugCorp were divided into drug discovery and drug development, with multiple product development stages in the latter. The following subsections look at how managers coordinate and evaluate the progress of innovation under such conditions, analyzing drug discovery first and then drug development.

4.1.1 Management of drug discovery. The laboratory activities of drug discovery centered on an idea for a molecule that the chemists thought they could synthesize, while pharmacologists set up a testing system to test their compounds (molecules). DrugCorp had found several promising compounds over the years and taken eight projects of product development up to the stages of clinical trials. In drug discovery, there was usually no clear pathway or product concept to work on. The researchers' choices were informed by their background and experiences, although much of it was "just guessing", as the interviewees repeatedly described.

At this stage, accounting information was used but in a rather limited way. Information on annual research costs (e.g. human resources as fixed costs and possible laboratory materials) enabled simple extrapolation of costs for research processes extending for multiple years, assuming similar resources were used each year. In either case, the results of the work could amount to zero because no one could predict if any of the experiments would succeed in the laboratory.

> It can go on for a month [. . .] a year [. . .] three years [. . .] five years before an elite compound can be identified. During that time, you have no way of saying whether the hit is coming tomorrow or [. . .] whenever. It may come in today's experiment or maybe tomorrow. (CEO)

During that process, no performance metric was found useful to evaluate the performance of drug discovery:

> It is very difficult to manage because you do not have any indicator. [. . .] I do not have any metric for the performance of that type of work. [. . .] You can look at how many certain units you have [. . .] whether the consumption and reactions are at an appropriate level. [. . .] If it is low, then you may think they are not working well enough. [. . .] Of course, we could measure how many molecules come from that process, its throughput? But we actually do not measure that because it is a quite artificial measurement. We just rely on the fact that everybody wants to make it as fast as possible. Sometimes, it takes longer; sometimes, it takes a shorter time to get the molecule done or a set of molecules synthesized. (CEO)

Although no performance metric existed, managers still needed to know whether the activities in drug discovery had any potentially valuable outcome. Were there structural activity relations that could be therapeutically useful, or could only so-called spikes in the laboratory be detected? Should they continue pursuing the existing biological target, or would it be too difficult?

In this context, the only way to assess the progress of drug discovery and provide evaluative feedback was to bracket the people, their ideas, and their work out of the laboratory environment into a meeting room. Consequently, regular discussions between different groups of researchers (chemists and pharmacologists) and between the Director of R&D, top managers and laboratory people were held, in which the activities of drug discovery were regularly reviewed and analyzed.

Several roles of these meetings can be pointed out. Firstly, the meetings allowed bracketing people in time and space, so they could look at their work from a distance, outside their immediate working environment. Things that might appear to perform well in the laboratory might not when looking at laboratory data in a meeting:

> You meet these guys [scientists] in the hallways. They are so proud: "We made a good experiment yesterday. We got cells, and they are alive. Now they have been cultured, and soon, they will be tested. And it is progressing really well". But when you get the people to put the data together in the meeting [code C in Appendix 2], they realize that, well, it does not look so good. (CEO)

Meetings enabled putting project members in situations where they had to analyze their activities and results in a different format, often switching from the usual laboratory report to a form of structured presentation which others could debate and challenge during the meeting. This was to create a stage in which hidden concerns and relationships between the tasks could be revealed, and more tacit forms of knowledge challenged:

> If you actually prepare, write this as a presentation, then you have to summarize it, and give it a structure; tell a story. There is always an opportunity that doing that, you may see the connection between things that you have not seen before. It usually contains very technical information. If you summarize things and put all the information together, you may see such a relation that exists but that you did not recognize before. (Director of R&D)

Laying out and analyzing the data in the laboratory and bringing the same data to a meeting for wider discussion could yield rather different results regarding project performance evaluation.

This potential of meetings was also due to the ability to use resources that could not otherwise be relied upon or counted. For instance, the interviewees repeatedly mentioned "a gut feeling" as a valuable resource when the question of performance evaluation arose. Managers could even point to certain people who had better intuition about such issues:

> Thomas [Director of R&D] is excellent. [. . .] His guts are excellent in understanding whether there is something coming out. (CEO)

Because of his "excellent guts", the Director of R&D was the person whose opinion counted when no performance information was available. This type of resource could not be reported or utilized in any other way than via face-to-face interactions. During the meetings, it could be possible to reach some form of understanding of whether things were going well – a set of hypotheses and a sense of feeling of whether the next laboratory experiments might work or, alternatively, a sense of uncertainty and failure that made the success seem less likely. In the latter case, a meeting was the site for terminating projects. For example, when a biological target had been pursued for more than a year without success, the manager had "to be strong enough and say that, "Ok, that's it. Let's do something else"", as the CEO commented.

Second, meetings were relevant in generating goal congruence in the organization. Similar to knowledge-intensive firms (Alvesson, 2004, pp. 122-123; Robertson and Swan, 2003), DrugCorp's top management had low organizational significance and power, as most employees could organize their work autonomously. While this gave employees freedom in their tasks and space to be creative in the laboratory, managers also raised concerns that scientists' work might not always serve the interests of the firm:

> Scientists in R&D very easily start to live their own lives—they do what is interesting and nice and where you might receive good results, also from a scientific career perspective, application, or whatever. [. . .] But this does not necessarily serve the purpose of the company and why investors have put money into it. (CEO)

Consequently, pre-structured meetings were set up to not only discuss the laboratory experiments but also to direct employees' attention to certain topics outside their immediate working environments, such as new inventions, the competitive situation in the market, and the commercialization tasks of the organization. This relates to the particular characteristic of meetings that allows bracketing people and topics into a separate arena of discussion (Boden, 1994). After implementing a more structured system of meetings (Appendix 2), managers observed that the discussions among the scientists were changing. Over time, the laboratory questions of drug development became more integrated into the wider set of topics relevant to the firm:

> There is a little bit more discussion now [among the employees] about competitors, the future, what kind of new products are entering the market, etc. People are discussing these kinds of things, which I think is very healthy for the company. [. . .] Before, they really talked a lot about hardcore science—receptors, compounds and those kinds of things. (Director of Business Development)

Regular discussions on a list of predefined topics, often presented in form of a bullet-pointed list, made the scientists more knowledgeable about topics in areas outside their own expertise. For instance, the scientists started to pick up market-related information from conferences and interactions with external institutions and draw on this information during the discussions in DrugCorp.

Third, a particular advantage of meetings in DrugCorp, compared to other forms of interaction, was the ability to arrange different people around certain topics of discussion. This involved bracketing not only the topics but also the array of knowledge and competences in each episode of interaction. A semi-formal arrangement of meetings changed how such bracketing (inclusion and exclusion) would have otherwise occurred around the laboratory, office or water cooler:

> If you have a discussion at the water cooler, you may exchange information, but it is a discussion between two or three people, so you have *inclusion* and *exclusion*. If those people repeat the same discussion with somebody else, you are disseminating information in a very personal way. You are not disseminating to the whole group. And that means that you are not trying to recruit all the intellectual capabilities that might contribute to the topics. That is why you have to have a discussion with the whole group. (Director of R&D)

Such bracketing made meetings relevant to knowledge integration (Ditillo, 2004; Morris and Empson, 1998) and practices of informing (Preston, 1986). The managers repeatedly emphasized the relevance of this function because despite the general knowledge background the specialists shared, their knowledge and interests were largely dispersed, so their collaboration was not always ensured. Differences between the working tasks and educational backgrounds of chemists and biologists, as well as technical workers and scientists, could make them see different problems and pursue different solutions. Scheduled meetings organized these groups of professionals into arranged episodes of interactions requiring them to go through a list of topics. In this way, different areas of knowledge and work of drug discovery were regularly bracketed into focused discussions.

4.1.2 Management of drug development. When there is a success in the laboratory, and a lead compound (a compound that acts properly in the test tube in cell-lines) found, the stage of drug discovery is completed. This is where the involvement of management controls becomes more visible and relevant: the budget is prepared, a project manager appointed, and the project added to the list of the firm's other projects. While in drug discovery, there is usually no clear pathway or product concept on which to work, drug development allows drawing a roadmap for the development process with stages and decision gates. In DrugCorp, each project had one promising compound within the area of neurotic and psychiatric diseases (lead molecule) on which chemists and biologists and the contract laboratories worked, conducting the screening processes, lead development, and preclinical trials. Each compound had to go through pre-clinical and clinical stages (labeled I, II and III) to collect evidence and demonstrate that it would work safely in living organisms.

DrugCorp used several management control tools in product development. First, it prepared and regularly monitored traditional budgets for each product development project and department, as well as the overall firm. Although the budgets were considered highly necessary and monitored relatively strictly, the managers were aware that this information did not reflect the performance of the projects or the firm:

> When I report to the board, I show the cash burnt over three months against budgeted cash burn. This is one report that has to be given, but it does not show the real performance. The company is not performing any better or worse whether it meets the financial indicators or not. [. . .] They [financial indicators] are not suitable for dividing [performance] into good and bad. They are just not suitable. (CEO)

Over the years, the managers had found that financial indicators were necessary for defining the boundaries of projects but had the potential to negatively affect innovation development if taken too seriously. Similarly, budget information had proven to become a too strong indicator that could prohibit playfulness and experimentation:

> It seems that sometimes they [employees] take it even too seriously. They want to save money and help the company that way. [. . .] I realized that sometimes chemists or pharmacologists were not ordering things or not doing activities they thought were too expensive. So, I had to explain to them that it is not good for the company if you save a couple of thousand euros here and not order that reagent. It is more expensive if you lose the opportunity. (CEO)

In a sense, meetings were sometimes used to soften up the constraints financial information may have posed on innovation.

Second, annual performance targets were set in the form of "milestones". These were used for the internal evaluation of projects and communication about the project to the board of directors, as venture capital investors were eager to learn about project progress and expected results at every stage of product development.

> An indicator, for example, is that during the first half of the year, we should have terms in place with a pharmaceutical company considering the FZ license [abbreviation for a specific drug], either regional or global, for North America or Europe. And then close an agreement at year end. In 2005, for instance, we had a milestone where we said that we should have terms in place with some company by the first half of the year. I think we had it in July; we almost made it. It was close enough. [. . .] These targets are included in the annual operational plan. (Director of Business Development)

Such broad non-financial targets gave the feeling that a project was to some degree under control. They provided a point of reference to orient a project through the stages of development. One could get a feeling that an innovation was progressing:

> In development, you have a plan to follow. You have a feeling you are controlling the happenings, and we try to keep that feeling. That is why you have plans and timelines, and a basis to monitor how you are hitting those timelines. (CEO)

> It gives information on whether you are progressing or not, so the only evaluation we can have is whether we are meeting milestones. [. . .] It gives a clue of what you should do next time to make progress. (Director of R&D)

The milestones were collectively set with the scientists' active involvement during annual budgeting for each cost center and regularly monitored throughout the year, albeit in a rather open and flexible way, allowing the scientists a high degree of freedom:

> Scientists are difficult, if not impossible, to manage according to conventional organization management. They have a [. . .] high desire for freedom. Scientists and technical people cannot be commanded; they have to identify themselves what is important to do. [. . .] They are very independent, and that way, they work the best. You cannot change them and put them into very strict frames, giving them tasks. Then we are losing every bit of creativity they might have. (CEO)

For instance, the targets to have licensing agreements in place and reach Stage I clinical trials were broad enough to provide the necessary freedom for the project members to reach these goals. The targets set in form of "milestones", as the interviewees called it, allowed keeping that freedom.

Overall, the system of budgeting and broad targets could give managers an indication that the projects were succeeding throughout their various stages. The roadmap of stages and milestones could construct a sense of order, even though the managers and members of the innovation projects repeatedly mentioned that they were well aware that the projects could fail any day, hour, or minute. As straightforward and linear the roadmap of drug development may have appeared on paper, with a detailed list of tasks and milestones for each stage, the actual process was highly uncertain. Most factors affecting the compounds were relatively unfamiliar, and much of the behavior of compounds was unknown until revealed in laboratory or animal testing. The technological uncertainty was extremely high, as the Director of R&D discussed in regard to one project:

> We were very excited about how the compounds behaved in animal testing; it was very promising. And then we learned of a very serious toxicity problem, and it seemed to be in every

> tested compound within the glass [test tubes]. It was the so-called class effect [related to a feature shared among the class of compounds]. Those are technical issues that mean we have to go back, not to square one but square two and restart the project, go with a different chemical, and find a different chemistry area to work in. (Director of R&D)

Similarly, any new information from the market, regulatory and patenting offices and preclinical trials could bring negative news and force the firm to reconsider projects' status and value:

> Sometimes, we think we have an innovation, a patentable discovery. We do the filings. In two years' time, we realize that from the 13 claims in the original file, we can defend only one. Then we have to say, "Well, after 100,000 euros, we have only one claim to defend, and we have wasted all this time and money". It happens. In the field of second medical use[2] patents, with patent offices in Europe or in the States, you can have very unpredictable views on whether this is innovative, whether it is not obvious, whether it has commercial prospects, and so on. (CEO)

In this context, coordinating the processes throughout the stages of drug development entailed a certain level of awareness that events in the laboratory, markets and legal affairs could fail next week or month, possibly due to the least-expected element in the process. Reaching the milestones and completing the tasks of each stage of drug development gave a sense of temporary mastery, albeit without considerable control.

To handle this uncertainty, more important than the budget and milestones for each project were the checklists of relevant topics for each project. These were prepared for each meeting and meticulously followed (project meetings, code C in Appendix 2) to analyze every project from all possible angles. In addition to such bracketing of topics, much attention was paid to bracketing people to discuss these topics. This involved organizing special meetings to investigate the same topics from different angles. The managers created a matrix system for meetings that switched the emphasis on the issues and empowered different people to discuss matters concerning each project. Usually, regular project meetings (code C in Appendix 2) were held to discuss the project's general performance and issues related to biological targets. In operational meetings (code D) held immediately after the project meetings, the checklist had many of the same items, but the floor was given to the heads of cost centers (departments), who saw the same issues from different perspectives, often pointing to problems involving technical resources not deemed relevant in previous meetings. Although experienced as complex and time-consuming, these multiple meetings were also useful for revealing issues not known before:

> Before this system was established, we did not discuss that a lot, at least from different angles. (Director of Business Development)

In addition to the high degree of uncertainty in each project, the considerable complexity of the knowledge involved made performance evaluation rather ambiguous. The sense of temporary mastery accompanying the stages of the projects was continuously challenged by the relative weakness of each target. Milestones, such as identification of clinical drug candidates, initiation of Stage I, or reaching a licensing agreement were not only broad but relatively weak and fluid performance indicators by themselves. Reaching a milestone was generally considered to be a good sign but did not necessarily mean that a project was progressing well. Project performance depended on the interplay of many elements related to technology, regulatory affairs and commercialization.

In response to this ambiguity, more important than the definition of milestones were the structured meetings where performance evaluation was conducted. These meetings were used to review the status of work in the laboratory, departments and markets. While the

firm's small size allowed for close contacts and continuous interaction across functional areas, a dedicated system of regular meetings involving projects, departments and specific groups of chemists and pharmacologists (see codes C, F and G) added to this by allowing for more detailed monitoring of projects:

> One thing you need to have is a product development monitoring and evaluation system in place, where you can consider different elements of your project, the opportunities and feasibility, the strategic fit with the company, the valuation, the financial implications, and monitoring of the progress. (Director of Business Development)

The basis of each meeting was a set of collected textual materials: laboratory documents, project reports and database records on the compounds, with each manager partly responsible for updating the database. The firm created its central database for the purposes of control (directing attention to relevant topics) and information dissemination:

> Scientists have to think about the things listed in there all the time, but can still have freedom at the same time. (Director of Business Development)

Each file consisted of statements on topics in biology, chemistry, marketing and finance involving, for instance, laboratory data, project status, competitor analysis, project activity reports, budgets, actual expenses, expected revenue, commercialization strategy, patent application status and lists of obstacles and threats. The managers attempted to handle technical and commercial uncertainty by collecting information on each area and making it visible to the actors involved.

In practice, however, scientists and middle managers were not so eager to spend time updating the system. Relevant information was often missing, or topics were only partly covered. This problem was solved by the arrangement of regular meetings. Different topics in the database files were assigned to different meetings, so scientists and managers started to update the system by the time of meetings discussing certain topics. Although the database was not updated daily, it became systematic in that it provided regular updates and monitoring of all project-related topics. The style of writing and the exact format of the text were not specified, but the meeting system became relevant in regulating the reporting on different topics and making the flow of information between the information sources and the central database more systematic. Consequently, the system started to function as a frame for updating and preparing reports (e.g. project reviews, budgets and milestones) and files (e.g. patent status, competitor situation and lists of obstacles) in the database and bringing them together for scheduled discussions of each project.

Dedicating a selection of topics and people to regular meetings was also a way to handle projects and decision-making that required complex knowledge. Specifically asking different specialists for their views on each topic allowed combining the information presented in textual form with richer views from various perspectives. Participants of innovation development were bracketed out from their environment to create a different arena for analysis and make them form opinions on matters:

> It is important to have meetings and discussions with the whole group to exchange the full extent of information and ideas, and also *to insist people form an opinion* and paint the picture of where we are. [. . .] If you just have a discussion at the water cooler, there is no way you can have same kind of response. (Director of R&D)

At the end of a meeting, the closure of the episode of an interaction, a story of good or poor project performance was usually formed, along with stories about competitors, suppliers, patent filings, and recent developments in the field. Each meeting included a presentation of

a project or department, giving evidence about the events that had taken place. Afterward, a narrative about the performance was formed through discussion:

> We usually do this together, this pharmacologists' report, to show the structure of the compound; the test results. And then something will be presented that is relevant for comparison, and then the conclusion will be: Is this working or not? Is this better or worse? And should we do or not do that? This is the basis for presenting the information, having a discussion and making decisions. (Director of R&D)

Another part of such a closure was a list of items, so-called red flags, that needed to be acted on and checked again in the next meeting. In this way, each episode of interaction created items for future discussion, thereby producing further interaction (Luhmann, 1995). Consequently, a considerable time in each meeting was spent discussing the items flagged in earlier meetings. If an item recurred in three consecutive meetings, it was considered to be a sign of a poor performance requiring more serious action or re-evaluation of the project.

In summary, meetings formed a central arena in DrugCorp where management controls (e.g. budgeting, planning and performance evaluation) were enacted, and information flows and reporting (e.g. project reviews, laboratory reports and database updates) were made systematic. Sometimes, such system of meetings was experienced as overwhelming, creating doubts as to whether managers had pushed the system too far. As one of the managers commented, "our worry is that we may be having too many meetings". Formal meetings could be demanding, requiring agreement on many matters (Schwartzman, 1989, p. 279). Efforts were always needed to arrange the time and space for meetings between everyday tasks and traveling. Consequently, some employees expressed concerns that the meeting system might be too bureaucratic. The business development director had similar concerns but added: "I cannot imagine us without it either".

4.2 TestCorp

TestCorp is a Finnish biotechnology firm, employing about 25 employees and operating in the medical biotech industry. The firm develops, manufactures and sells diagnostic tests applicable to fertility, veterinary, food hygiene, allergies, and various infectious diseases. The firm has its own production facilities and it sells its products via specialized distributors. Its customers are diagnostic and pharmaceutical companies, which subsequently organize sales in their countries to pharmacies, hospital laboratories, and home users. TestCorp's main markets are Finland, the Netherlands, Germany, the Baltic States and China. At the end of the data collection period, steps were taken toward the US market.

During data collection, TestCorp was focused on the development of 15 innovation projects. One involving the development of a new technological platform could be considered a radical innovation, whereas the other 14 projects were based on technology platforms TestCorp had developed earlier and held several patents and patent applications worldwide. These 14 projects used the firm's four existing technology platforms and involved the development of new products (e.g. allergy tests) or improvements to components in existing products. Compared to DrugCorp, most innovation development by TestCorp involved significantly less uncertainty as the projects relied primarily on existing resources, with only few exceptions, and involved the application of established technologies, as typical of incremental innovations (Abernathy and Clark, 1985; Ettlie *et al.*, 1984). Uncertainty was also lower because the desired outcomes of the innovation activities were usually more clearly defined, and the period of product development was shorter.

In addition, the markets for TestCorp's products were relatively well known. Unlike the technology-driven approach used in DrugCorp, TestCorp developed several products in response to market demand and in close collaboration with customers, representing incremental market-driven innovations (von Zedtwitz and Gassmann, 2002):

> We get ideas from the market as we are communicating with our customers on almost a daily basis. We get information, ideas, and product proposals from them. We are developing new products from areas where we already have marketing channels. [. . .] Therefore, we are focusing on the products within the same field. [. . .] We also make product improvements. All products need remodeling because competition is changing all the time. We have been selling our cardiac test for 9 years, but are still developing it because the competitors are changing. (CEO)

In addition, the complexity of TestCorp's innovation projects varied, depending on the depth and variety of knowledge demanded for the tasks, which often involved technical challenges that required involving people with different knowledge backgrounds and external research collaboration. While the expected project outcomes were usually known, the causes of emerging problems and the technical challenges in the laboratory were often difficult, if not impossible, to identify. Consequently, despite relying on existing technology platforms, TestCorp often undertook relatively complex projects, introducing some legal and regulatory uncertainties for the firm, as illustrated in the following sections.

4.2.1 Fluid forms of control in managing innovation. Compared to DrugCorp, TestCorp's creation and definition of what could be labeled projects in product development was much more informal. Asked how many technologies and product development projects the organization had underway, the managers started counting on their fingers and suggested that at the time, there were around 15 R&D projects. The organization had no official list of what it called projects, but the managers and the R&D personnel had a general understanding of the activities of the R&D department. Some so-called projects were more formal and involved product development agreements with customers that set more formal expectations for the project duration and resources. Others were more loosely defined, depending on the available time and human resources in the laboratory.

The flexibility around the definition of projects arose from the absence of formal budgets in place to monitor the development of each project. Instead, a budget was prepared for the overall R&D department, with broad expectations for the various activities throughout the year. This was not because resource consumption by innovation projects did not matter but because the low organizational and market uncertainty resulted in a relatively stable cost and revenue structure. Production and marketing relied on fairly stable sales and production plans, and the majority of R&D expenses consisted of fixed salaries. Information on R&D expenses was not regularly reported and discussed, as in DrugCorp, but only when needed. Lower uncertainty regarding the duration of projects and the relative simplicity of acquiring cost information did not require scheduled discussions of budgets but, instead, enabled producing cost information on the spot:

> We know exactly how many persons we have in the different departments, and their salaries. We also have outside contracts, clinical research adding to those expenditures. Especially now, we have a big project, registration of the product in the US, so we know these extra costs. Sometimes, we estimate costs, of course. When we estimate the time [. . .] OK, do we start now to make these trials and try different antibodies and other raw materials, and do optimization? It takes, let's say, half a year. And two persons are working full time on that. Then we know exactly what the costs are for that. (CEO)

Budgets and profitability reports were prepared and regularly discussed only for production, sales, and marketing. In product development, regular project reviews and

budget analysis were considered to be unnecessary for project progress despite the high number of projects. Accounting calculations were mobilized depending on the question at hand, not as a regular practice. The CEO insisted that accounting for product development was "easy", and anyone could do it when needed:

> We do not make any official budget plans because we can see that so easily. I see that with 5 per cent accuracy, I can do that in my head. [. . .] We can control everything quite easily. I call, "What is new in this? OK, we are making the contract to do this clinical trial. How much does it cost? 50,000 euros? OK, we will do that, [. . .] or not". It is easy. (CEO)

Often, the question of resource allocation for innovation activities came down to a matter of how much *time* it took to develop a product or a technology. The investments in innovation projects were planned accordingly:

> Salaries are running all the time. It is a question of which projects we allocate those human resources to. [. . .] The money is almost the same at different times. If it takes three months to make this, it is OK. If it takes three years, it is not OK. (CEO)

In general, the project performance and the R&D department's activities were not measured or discussed formally with an extensive document trail, as in DrugCorp. Only one ongoing project developing a radical innovation involved more formal documentation and monitoring throughout the project stages due to the need to prepare a patent application and the challenges to maneuver around existing patents in foreign markets. Such projects usually took up to 2-3 years and required more extensive resources.

For the other projects, monitoring took place in a more informal environment. Each development project was defined by its length, often further divided into stages, not because it was considered to be necessary for managing them but because quality control required it. Much of the documentation was produced and review meetings held for external control purposes:

> Of course, we need the formal reports. There is no doubt about that because, for quality people and inspectors, we must show that we are keeping these formal meetings, then make decisions, and then continue with what we need to do. What I want to say is that we are trying to minimize the time for this. We do not see the real value in this formal [. . .] Of course, it also helps, but the value is a little bit questionable. (CEO)

The quality control system required three or four review meetings, in addition to certain documents, during the product development, which was often perceived as a burden to the firm's ongoing activities. TestCorp's solution was to collectively complete some documents during the review meeting and regulate the closure of these meetings by time (Luhmann, 1990):

> It [the project review for the quality system] is completed during these meetings because different people can bring some information. [. . .] There are also some prepared materials. We try to keep this review as easy as possible. After one hour, we try to have something ready. We discuss mainly quality requirements, but there may be also our own [technical] requirements. (Head of Quality Control)

Significantly, the meetings in the product development stages were scheduled and held following the quality control manuals. However, the value of these meetings for managing and controlling the innovation process was questioned, and most decisions were made earlier during discussions in the laboratory or *ad hoc* meetings of the R&D manager, the CEO and quality control staff.

4.2.2 Costs of bracketing. In general, meetings had a rather different role and purpose in TestCorp compared to DrugCorp. Whereas DrugCorp used an extensive system of regular

meetings including lists of textual materials and predetermined participants, TestCorp deemed such system unnecessary. It did not generally use regular meetings to screen project status and progress or believe it was necessary (unlike in DrugCorp) to involve laboratory personnel in regular firm-level discussions about marketing and regulatory affairs.

Management meetings and R&D review meetings were the only meetings held regularly to analyze existing products and make broader plans for new developments by the R&D department or review the status of R&D projects. In these meetings, instead of project review presentations or cost and revenue estimates, the participants made decisions concerning the need for potential product developments, drawing on discussions in which they expressed their *feelings* about products' potential. The participants could then rate their opinion on a scale of 1-10:

> We discuss what products we have and if there is something we should skip, and where we can see big opportunities and so on. This is more about existing products. We did a kind of table where we put some numbers, what are our feelings about the products, about the market, those kinds of things. Our CEO organizes that. We do not have exact numbers but some feelings about the market potential for some products. (R&D Manager)

Review meetings for R&D projects were usually held once or twice a year or when the CEO saw a need for such review. Such meetings often served as a resource that could be relied on when the need arose:

> If there is something important that we should discuss together, we call up this meeting. (R&D Manager)

The interviewees repeatedly stressed that regularly bracketing people from their ongoing activities was too expensive. The managers often found the opportunity costs of meetings to be too high compared to the benefits they could see:

> We are not too formal in these [reviews and analyses of the innovation projects] because in a small company, we must quickly do those things that need to be done to leave more time for long-term studies and development projects. [. . .] The idea is not to load the organization with unnecessary things. (CEO)

While every step in the laboratory was recorded in laboratory books, reports and databases for quality control purposes, there was no need to have an extra discussion to look at that information in a meeting room (as it was done in DrugCorp). TestCorp considered bracketing people and topics into arranged discussions about project performance to have low value and importance for managing incremental innovation. The managers insisted that they liked to make R&D-related decisions informally and not overload the department with meetings and formal controls, implying that these wasted valuable time. The CEO repeatedly argued that all kinds of reporting and systems of formal meetings were "justified only in theory":

> Theoretically, of course, we can do that, but it is extra work. [. . .] Can we manage better? How does it help us? [. . .] We can load ourselves full of counting and work without giving real value. If there are things we cannot control, then we must look and count them. But [if] they are under our control, then the most important thing is that we do not waste time [on] those kinds of things. We are spending time on real things that are driving our business further. (CEO)

Similar to the quality control meetings mentioned, managers had made a rule to regulate the closure of project review meetings based on time (Luhmann, 1990) to reduce the effect of bracketing on the organization's other activities:

> We decided that this year, we should not spend more than one hour on those meetings. If we do not have time to discuss everything in one hour, we will have another meeting. Previously we had meetings every three or four months, and . . .we spent like 2 or 3 hours in meetings. It was not nice. I wanted to change that. Now we have this one-hour limit. (R&D Manager)

Even if a discussion of the projects was not finished, returning to daily tasks was considered to be more important than finalizing the project review. The managers insisted that these rules not only made meetings shorter but also reoriented meetings from the discussion of performance to more concrete problem-solving and action planning.

4.2.3 Informal interaction and ad-hoc meetings. While TestCorp kept regular meetings to a minimum, much evaluation and monitoring of innovation projects took place during everyday interactions in the laboratory, hallways and offices. The managers argued that they could assess the performance of ongoing projects relatively easily because the uncertainty and complexity of incremental innovation were regarded as manageable. Product development activities were usually monitored based on the agreed-upon timeframe for each project (usually 3-6 months). Indeed, an indicator of project performance was the "existence of a problem" that would push a project from its time plan.

Problems were usually related to the success or failure of laboratory experiments or an obstacle to a diagnostic test meeting a desired quality standard. For instance, when a diagnostic test unexpectedly started showing false negative or positive results, this could be due to variations in the quality of suppliers' raw material, materials in the laboratory not exhibiting the expected behavior or blood cells behaving in unexpected ways in the allergy test development. Assessing project performance, therefore, did not require extensive analysis and screening but was often revealed in the laboratory during hands-on encounters between managers and employees and information exchanges in the hallways, offices and even outside the office as some managers carpooled (e.g. the R&D Manager and the Head of Quality Control).

Much of the performance evaluation relied on good or bad news from the laboratory. Such assessments were made not during scheduled meetings but daily interactions during the R&D manager's visits with the scientists in the laboratory or informal encounters in the office:

> If there are good results, they [the laboratory staff] definitely come and talk about it. If there are bad results, they also come and ask me to see those results. (R&D Manager)

Indications of poor performance were related to bad news or the existence of a problem. Thus, management control of the development activities in the laboratory was essentially organized around problems. Data on performance constituted a verbal "report of problems". "Everything I do is to look for problems", said the R&D manager.

> Success . . . I can only see if this is working by asking my subordinates whether there are difficulties. [. . .] I go to the lab, sit next to them and discuss what they are doing and show some small problems and bigger problems. (R&D Manager)

Much of the evaluative feedback involved the identification of a problem's size. The distinction between small and big problems was considered relevant in understanding project performance. A small problem was solvable within a short time and did not significantly affect the project timeline. A big problem made the project to go over time and, consequently, became costlier. Some small problems were later recognized as big when it was discovered that the possible solution conflicted with existing patents or regulatory affairs in markets, or the customer did not agree with the technical solution. In most cases,

laboratory staff and managers would agree on the scale of the problem and judge the project performance accordingly.

Meetings were mainly called when there was a need to solve a problem, discuss an idea, or decide on a more significant matter concerning resource allocation. In other words, meetings served as a *resource* for corrective feedback, to initiate a discussion for knowledge exploration after (poor) project performance had already been assessed during everyday interactions. Many managers frequently explained the need to call a meeting: "The meeting was held, because there was a problem." Consequently, meetings usually focused on a specific breakdown of a diagnostic test:

> If we have a problem with tests, we hold a meeting in the laboratory. We have some results, and then we all look at them together. If the problem is related to production, we can sit here in the meeting room. The CEO can also come and join the discussion. (Head of Quality Control)

Some managers were especially known for calling a meeting over unexpected matters. The R&D manager, for instance, said that the director "calls a meeting when there is a problem". In such cases, the level of the meeting usually depended on the size of the problem:

> Usually, the reason for having this [management] meeting is when we have a big problem, and then we have a discussion of that problem. At the same time, we could, of course, discuss something else, some other topics, but it is more like everybody is afraid of coming because there is a big problem, and we are trying to find a reason or someone responsible or something like that. (R&D Manager)

Good and (especially) bad news were often the primary trigger for the managers to arrange an extra discussion and knowledge exploration. A problem with a product or a project was an indicator of performance and it needed to be accounted for.

While providing evaluative feedback via identifying problems during everyday interactions was considered to be relatively unproblematic since the identification of problems did not require complex knowledge (compared to DrugCorp), the process of finding solutions, that is, corrective feedback, was often rather complex, involving in-depth knowledge and a high degree of technical and regulatory uncertainty. Poor project performance might be clear without knowing its causes. As the R&D manager stated, "we can see that something weird is happening in our test, but we do not know why." The causes of a problem that could be easily identified in the laboratory could still be rather difficult to understand. The aim of a meeting then was to understand the source and severity of the problem and draw out possible solutions, for instance, in the case of red blood-cell problems related to one diagnostic test:

> Those red blood cells are distracting from the process for some reason, and I do not know what is breaking those blood cells. [. . .] We can guess that if we change this product this way, we can speculate that there is this kind of effect, but we never know exactly. Usually, we try the first idea, and then we can at least see what happens, and then make a more educated guess about what to do. (R&D Manager)

In many cases, including this example, a meeting required navigating the entire network of raw materials, technological issues and possible human interventions. Identifying the causes of the problem could require more than one meeting with different sets of participants. Several of TestCorp's market-driven R&D projects allowed much less freedom and time to make changes in project technology when encountering such problems. Changing some elements in an existing technology could also encounter strong resistance from the market and regulatory agencies. For instance, to solve the aforementioned problem of the blood cells, the laboratory staff and R&D manager tried to change the technology

platform of the allergy test and develop a new way to treat the blood cells, but this created a new problem. Changing the product platform prevented TestCorp from selling the product in Japan due to patent problems. The managers again tried to change the product platform to perform the purification in another way, but the cells started showing unstable behavior in other tests. A series of ad-hoc meetings was arranged following the trail of news from the laboratory. Instead of focusing on project performance evaluation (as in DrugCorp), most of TestCorp's arranged meetings were significantly oriented to problem-solving (corrective feedback) because this was where the firm faced the most complexity.

Ad hoc meetings and informal encounters in the laboratory remained sufficient to monitor the performance of innovation activities. Written reports on the progress of product development projects were not common in TestCorp. Reports on project performance were only prepared when needed, for example, for collaboration with partners or government funding. The managers expressed that such reporting took away valuable time from other activities and was not worthwhile for managing incremental innovation. Instead, more useful accounts of project progress were "running" in their heads:

> I am calculating all the time in my head. [. . .] When making this new cardiac test: OK, it takes half a year at least when we try these antibodies, and we try these clinical samples long enough so we can trust it works. It can take at least half a year and so much money, OK. And then marketing [. . .] those things take that much time and that much money. (CEO)

Evaluative feedback based on good/bad news and small/big problems was considered to be adequate for management of incremental innovations because it did not take much time and allowed immediately focusing on problem-solving (i.e. corrective feedback). It was not necessary to bracket topics and people out of their work environment and to "bring the laboratory to the meeting", as DrugCorp insisted upon. TestCorp only called more formal meetings to communicate critical matters (e.g. a quality problem) or demonstrate issues to a wider audience (e.g. present an argument for a better packaging technology for a new product).

While allowing a significant flexibility in communication about innovation activities, such interactions also had some limitations the managers occasionally experienced. Formal structures of interaction were kept to a minimum, so information sharing about problems and issues in product development largely evolved along its own path, where prior knowledge, personal preferences and even the arrangement of work desks influenced the practices of informing and knowledge sharing in the organization. The managers developed their own ways of communication, following their routines of informing others. For instance, the R&D manager disliked scheduled meetings and preferred to communicate individually with every person. Other managers also preferred informal discussions over meetings to convince and negotiate with other managers, and often discussed the same issue in several separate informal encounters.

The ways the communication patterns were built influenced knowledge integration across different functions, sometimes creating internal blockages in information flows. For example, a R&D manager described communication with another department:

> I do not talk with manager *b*, or actually, I talk with every person in that department *b*, but they do not talk with me. So usually, I do not get information from department *b*, or I get the information [because] somebody in department *b* happens to speak to manager *c*. (R&D Manager)

Members of the organization had developed a collective understanding of these communication patterns. They knew who spoke to whom and took the peculiar communication methods as a natural feature of the firm. Participants of innovation activities

implicitly knew who needed to be informed, from whom to ask advice and who had to be invited to *ad hoc* meetings. Such interactions were considered to be problematic only in cases when the decisions did not satisfy the other managers. For example, in the case of the packaging of a new product, quality control staff discovered that the equipment selected during an informal encounter between two managers resulted in an unacceptable quality of the product label:

> Now, it seems quite difficult to correct the situation because it concerns the whole system of how this label is produced. Now, we have already accepted this machine. [. . .] Sometimes, things are accepted before they are carefully analyzed. [. . .] All things happen. (Head of Quality Control)

Another concern, especially by the managers of other functions (exports, marketing and production), was that the managers would like to have more information about product development activities to be able to respond to new product launches on time. The few scheduled product reviews and management meetings provided a relatively limited arena for a wider cross-functional discussion on product development.

Despite these concerns, there was a general tendency to reduce the length of meetings by attempting to regulate their closure by time and to refuse to add any regular meetings to the agenda. Strict reporting and regular meetings were seen as impeding the ongoing product development activities perceived as more valuable than spending time on presenting and sharing information in scheduled meetings. Meetings and stricter analysis of the results were considered to be relevant for other functions of the organization, as the CEO listed these priorities:

> Many biotech companies do not survive. Our success is that we have understood from the beginning that we must sell something. We focus on sales. Without sales, you cannot survive. Then we must produce in a way we can compete in the market. [. . .] So, the priority is daily business. Formal meetings [. . .] when we need those, we call people saying, "We must discuss this and that". [. . .] This [calling a meeting] is always based on actual needs. (CEO)

Regular meetings with prepared accounting reports were more common in production and sales. For monitoring and analysis of innovation projects, a more fluid organization of interaction was considered sufficient. Meetings could be used as a resource available when needed for analysis and problem-solving, where TestCorp faced the greatest complexity in innovation. Similarly, budgeting and revenue estimates were only made when needed to avoid burdening scientists with the tasks of reporting and collective discussions. Such ways of interacting and reporting allowed for flexibility in monitoring innovation development and responding to problems while not taking too many resources from the ongoing activities.

5. Discussion and conclusion

This study shows how meetings can serve as a meta-practice in the context of innovation development and how this has implications for management control of the innovation process. In particular, it illustrates the role and organization of meetings and the ways actors use meetings to handle uncertainties and complexities in innovation development. By investigating the structuring properties of meeting practices, this study provides an alternative perspective to the instrumental view of meetings, in which meetings have primarily been concerned with serving specific tasks and decision-making. It draws on Luhmann's (1986, 1990, 1995) theory of social systems, in particular, the concept of episodes through which organizational interaction becomes regulated to the extent of pre-planning and temporal *bracketing* of such interaction. We argue that how this bracketing takes place

has implications for how meetings function as a meta-practice and relate to the coordination and control of the innovation process.

Research has suggested that innovation development involves the application of multiple forms of control (Davila, 2000; Jørgensen and Messner, 2009; Nixon, 1998; Revellino and Mouritsen, 2009) or a system that Chenhall and Moers (2015) call a "more complex control," where several tools and forms of control are combined for various purposes. The two environments of innovation development presented in this study illustrate the structuring potential of meetings in such a context and how meetings can be used differently and have different roles depending on how they relate to ongoing innovation development activities. This study, therefore, suggests two distinct roles of meetings: as a means for regulating and ordering the innovation process and as a resource. The following sections discuss these roles in more detail and explain how the structuring aspects of meetings have the potential to shape the organization's management control system.

5.1 Meetings as regulating and ordering the innovation process

In highly uncertain environments, such as DrugCorp's development of radical innovations, regular meetings can perform an important function in the management of innovation. Boden (1994, p. 81) states that "meetings are where organizations come together". The present study suggests that meetings may serve as an arena where management controls come together. This, we argue, takes place through the mechanism of bracketing, which enables meetings to *regulate* and *order* the elements of innovation. The bracketing, not only in terms of time (Luhmann, 1990) but also the topics and participants of each interaction (Boden, 1994), makes meetings function as a means of *regulating* the innovation process. Meetings regulate the innovation process through bracketing the tasks and topics of product development into pre-determined slots of discussion so it becomes evident when and what is expected from participants and which reports they need to look at. In a complex environment involving multiple interdependent activities and disciplines of knowledge, drawing out the participants, topics, and reports for pre-scheduled arrangements serves as a frame that indicates when and where management control elements (e.g. project reviews, budgets and performance indicators) and information sources (e.g. market analyses, database updates) matter. It disciplines participants to organize their tasks accordingly, such as preparing the reports or filling in the gaps in the project management database, reinforcing management control and accountability along the path of innovation development.

The literature has suggested that in complex environments, certain designs of management controls (Bisbe and Otley, 2004; Simons, 1990, 1995a) or the use of a specific management accounting method (Hansen and Jönsson, 2005; Nixon, 1998) would encourage dialogue and organizational interaction. This study shows how the structuring potential of meetings can further shape such interaction. It suggests that meetings have the role of *ordering* innovation development by bringing together accounting and non-accounting information into themes and arranging the actors to contribute to these themes. This is due not only to the general ability of meetings to facilitate knowledge sharing and integration (Abernethy and Lillis, 1995; Ditillo, 2004, 2012; Morris and Empson, 1998) but also to the mechanism of bracketing that allows carving out the topics and tasks of innovation development into separate arrangements (e.g. eight pre-structured types of meetings in DrugCorp). In this way, meetings order organizational interaction through inclusion and exclusion of the topics and fields of expertise. This creates an arena for combining different fields of knowledge (including more tacit forms of knowledge) and developing hypotheses about the performance of the innovation process. This also adds to Jørgensen and Messner

(2009), showing that the structuring abilities of meetings can go beyond the coordination of tasks, organizing the topics and fields of expertise along the path of innovation.

This becomes especially relevant in a context, where no clear indication of the performance of an innovation project exists, and no single method can capture the development or handle the uncertain, complex trajectories of innovation. At DrugCorp, each report or tool was considered to be partial or even sometimes contradictory (as in the example of budgeting) to the success of innovation. There was no central indicator or report that would clearly point to the performance of innovation development, but instead, a web of meeting arrangements that would bring together heterogeneous elements (e.g. budgetary information, milestones, laboratory data, scientific and regulatory advances in the field, the scientists' views and even gut feelings) into a manageable list of themes that could be discussed and decided upon. Thus, meetings provide a common arena and an *ordering* mechanism that tie control practices into a system. Along with the reports involved, it becomes a system of episodes in which an innovation trajectory can be discussed in separate elements (e.g. technical, chemistry and pharmacological questions). Such a system has the potential to continuously stabilize and reinforce itself as the tasks and reports discussed in previous meetings feed future discussions (Boden, 1994; Hernes and Bakken, 2003; Schwartzman, 1989).

While existing literature suggests performance indicators as instruments for drawing the attention of decision-makers (Chenhall, 2005; Grafton *et al.*, 2010; Henri, 2006a; Jordan and Messner, 2012; Ullrich and Tuttle, 2004), this study shows how meetings enable such attention drawing via the ordering ability of meetings. This involves bracketing certain things and topics for attention while leaving out others, producing a degree of prioritization in innovation development. Such bracketing may involve an emphasis on a list of bullet points, a definition of an angle for a discussion, or a shift empowering different actors at each meeting arrangement, as seen in DrugCorp. By switching the emphasis between topics and actors, the relationships between the elements of the tasks can be better revealed. This becomes relevant in a context that requires in-depth and multiple fields of knowledge to understand the interplay of the scientific, regulatory and marketing affairs involved in each project. Defining the emphasis in terms of topics and actors in each meeting arrangement creates bracketed-out arenas that allow closer analysis of the elements of innovation. It allows temporally creating indifference to the whole and focusing the discussion on the particular (Luhmann, 1990). In this way, complexity can be handled by creating indifference to many other details or possible angles of the question at hand while allowing participants to focus on smaller segments of their reality and conduct an in-depth exploration of the particular.

The case study of DrugCorp illustrates that this regulating and ordering ability of meetings has the potential to create a sense of stability and control in highly uncertain environments. The mechanism of bracketing permits a degree of simplification and juxtaposition of otherwise continuously changing elements, making the evaluative feedback of innovation projects possible. In DrugCorp, such system was deemed valuable not because the performance evaluation in meetings was "accurate" or represented the elements of each project truthfully, but because the *continuity* created over the sequence of previous episodes (Hernes and Bakken, 2003; Luhmann, 1995), along with the snapshots of reports and laboratory data, enabled the construction of a narrative that made sense at particular points in time. Even in cases where a gut feeling was a valuable resource to overcome the lack of the ability to judge, the sequence of previous discussions and reports allowed such evaluative feedback to be useful, in that it was possible to see where necessary efforts had

been made in light of the agendas set in previous meetings. In this way, meetings allowed integrating heterogeneous elements of innovation into a process that could be followed.

These structuring abilities of meetings allow them to function as a meta-practice, a form of indirect control, through which multiple tasks and other practices can be coordinated. In this way, meetings can form a part of the organization's governance structures (Abernethy and Chua, 1996; Abernethy and Lillis, 1995; Malmi and Brown, 2008, p. 294) regulating and adding to the organization's other mechanisms of control. The case of DrugCorp shows how the particular mechanism of prescheduled meetings allows regularly adding the topics and issues to the dialogue (e.g. in form of bullet points) that would otherwise be missed by other elements of control (e.g. project reviews and milestones). Such bracketing creates new spaces where people are requested to participate, following an agenda that directs their attention from what they might have been discussing otherwise. This may become especially relevant in contexts where no other mechanism of control is available, such as drug discovery (different from drug development), in which the structuring abilities of meetings are used to replace the lacking mechanisms of control. This corresponds with the literature that suggests that in the absence of suitable management accounting and control techniques, other types of tools and practices may become more central to ensure accountability and coordination in the innovation process (Jørgensen and Messner, 2009, 2010; Taipaleenmäki, 2014).

5.2 Meetings as a resource

Significantly, the structuring abilities of prescheduled meetings described above involve considerable attention to the initiation of meetings. In such system, priority is given to meetings over ongoing activities: people have to stop their ongoing activities to attend. That is, meetings bracket time and space, taking the participants away from their ongoing organizational activities. The beginning and the end of such space are regulated so the participants are not expected to leave before the purpose of the meeting has been accomplished or before the agreed-upon ending time has been reached. Notwithstanding the benefits, such bracketing may make regular meetings an expensive practice, as experienced in TestCorp. In contrast to the regulating and ordering role of meetings, therefore, they can assume a less central role among the management controls of the organization – that is, meetings can be used *as a resource*.

When used as a resource, meetings do not necessarily form a stable structure (as in DrugCorp) but remain a dynamic arena of interaction that can be temporarily formed into episodes of gathering, but then neglected again in favor of concentrating on other activities in the organization. In TestCorp, meetings were used as a resource among other management tools available when needed. Meetings were not fixed in time or space and had no disciplinary role (except for quality control meetings, which the managers perceived as constraining and of low value). In this context, the role of meetings became mainly *instrumental*: to discuss a particular problem in quality control, an unexpected failure of materials in the laboratory, or a request from a partner for new research collaboration. This parallels the literature in which meetings and other forms of interaction are perceived as instrumental, serving the needs of specific tasks or decision-making (Allen *et al.*, 2014; Simon, 1997; Simons, 1995b).

This role of meetings also reflects in the relationship of meetings and management controls of the organization. In such an unstable form, meetings do not have power to tie together different elements of management control into a system but, instead, are enacted as separate elements of control. Budgets, revenue estimates, and cost accounting calculations can be used as elements of control available in the organization but not necessarily closely

coupled. A close parallel in this context is the account of multiplicity of controls described by Revellino and Mouritsen (2009), where the use of controls is situation dependent, varying and sporadic:

> [. . .] it is clear from the case that the controls are not durable, coherent and consistent. They do not have a continuous existence; they are mobilised in situations and do not function all the time. Sometimes they perform with great power but then after having done their work they can be pushed away. (p. 360)

In such an approach, meetings and management controls are used as a resource whenever circumstances require. In this context, as shown in case of TestCorp, a few management control elements (e.g. a broad budget for annual development costs) are used to set a wider scene with minimal structures (Kamoche and Cunha, 2001), while the use of any other tool of information gathering, planning and evaluative feedback is left up to the circumstances of each innovation project.

In such context, meetings are not scheduled months or weeks ahead of their actual occurrence but are called when there is a need to mobilize knowledge to solve a problem, discuss an opportunity or make a decision about resources. In this case, the initiation of meetings is highly informal and takes place spontaneously in response to the rhythm and circumstances in the innovation projects. Ongoing activities in the laboratory and the organization highly influence the time and purpose of any arranged interaction. In this approach, meetings are more loosely determined and often restricted by determining their closure based on time (Luhmann, 1990). Activities outside the meetings are often considered to be more important than the issues that could be discussed in the meeting (e.g. the performance of innovation projects in TestCorp). In a sense, the meetings and regular procedures of management control are seen as too costly because the temporal bracketing of meetings for performance evaluation would pause ongoing activities of the firm. This parallels the study by Abrahamsson and Gerdin (2006), in which productivity meetings became counterproductive to the shop-floor productivity that these meetings were intended to increase.

The use of meetings as a resource may be useful in the context of lower organizational and technological uncertainties, as shown in the case of TestCorp, because such an approach takes less time to evaluate innovation performance (evaluative feedback) and allows the immediate focus on problem-solving (corrective feedback). While permitting significant flexibility in communication about innovation activities, this way of interaction places high importance on informal and personal patterns of knowledge sharing and decision-making. The study also shows that while such use of meetings may be preferred by the actors more closely involved in product development, it can potentially limit the practices of informing (Preston, 1986) and knowledge sharing (Ditillo, 2004, 2012; Morris and Empson, 1998) between the participants in product development and other functional units of the organization.

The results of these two case studies also allow drawing some conclusions on the management of radical and incremental innovation. The literature has generally implied that different types of innovation require different strategies and managerial practices (Akroyd *et al.*, 2009; Davila, 2005; Davila *et al.*, 2009b; Rice *et al.*, 2009) as varying degrees of uncertainty entail applying different controls (Bisbe and Otley, 2004; Davila, 2000; Ditillo, 2004). The empirical results of studies vary, however, and often show less difference between management of radical and incremental innovations than expected (Akroyd and Maguire, 2011; Cardinal, 2001). The results of the present study show that radical and incremental innovation projects do not differ so much in the repertoire of controls applied

but in the way they are applied in terms of regularity and formality of practices. Much of the difference between the use of management controls in radical and incremental innovation may stem from the other practices, along which management controls are enacted. In the context of high degrees of uncertainty and complexity, such practices may provide a sense of stability and structure through which various pieces of information and elements of control are emphasized and brought together. In the context of lower uncertainties, the structuring role of these practices may remain less relevant.

In conclusion, this study illustrates the roles of meetings in the context of innovation development. More broadly, it shows that going beyond a merely instrumental view of meetings allows analyzing the relationships between organizational interaction and management control that would otherwise be taken for granted. This perspective also opens up several opportunities for future research like, for example, how managers choose and balance between different roles of meetings. More research is also needed on the conduct of meetings to investigate the role of bracketing during discussions, as the focus of this study was limited to managers' preferences concerning the general arrangement of such interactions. It would be useful to study how bracketing is more specifically related to the meeting process and the structuring of textual materials in meetings (e.g. accounting reports). This knowledge would not only be valuable in the context of innovation but also to advance the understanding of the functioning of management accounting and control systems in general.

Notes

1. Translation by the authors of this study.
2. Chemical compounds have an initially discovered primary medical use, such as treating a neurovascular disease. Should the same compound later be discovered to have a second medical use, for instance, healing headaches, the product inventor could pursue protection of that compound by obtaining a patent for it; hence, the concept of second medical use.

References

Abernathy, W.J. and Clark, K.B. (1985), "Innovation: mapping the winds of creative destruction", *Research Policy*, Vol. 14 No. 1, pp. 3-22.

Abernethy, M.A. and Brownell, P. (1997), "Management control systems in research and development organizations: the role of accounting, behavior and personnel controls", *Accounting, Organizations and Society*, Vol. 22 Nos 3/4, pp. 233-248.

Abernethy, M.A. and Chua, W.F. (1996), "A field study of control systems 'redesign': the impact of institutional processes on strategic choice", *Contemporary Accounting Research*, Vol. 13 No. 2, pp. 9-18.

Abernethy, M.A. and Lillis, A.M. (1995), "The impact of manufacturing flexibility on management control system design", *Accounting, Organizations and Society*, Vol. 20 No. 4, pp. 241-258.

Abrahamsson, G. and Gerdin, J. (2006), "Exploiting institutional contradictions: the role of management accounting in continuous improvement implementation", *Qualitative Research in Accounting and Management*", Vol. 3 No. 2, pp. 126-144.

Ahrens, T. (1997), "Talking accounting: an ethnography of management knowledge in British and German brewers", *Accounting, Organizations and Society*, Vol. 22 No. 7, pp. 617-637.

Ahrens, T. and Mollona, M. (2007), "Organisational control as cultural practice–a shop floor ethnography of a Sheffield steel mill", *Accounting, Organizations and Society*, Vol. 32 Nos 4/5, pp. 305-331.

Akroyd, C. and Maguire, W. (2011), "The roles of management control in a product development setting", *Qualitative Research in Accounting and Management*, Vol. 8 No. 3, pp. 212-237.

Akroyd, C., Narayan, S. and Sridharan, V.G. (2009), "The use of control systems in new product development innovation: advancing the 'help or hinder' debate", *ICFAI Journal of Knowledge Management*, Vol. 7 Nos 5/6, pp. 70-90.

Allen, J.A., Beck, T., Scott, C. and Rogelberg, S.G. (2014), "Understanding workplace meetings: a qualitative taxonomy of meeting purposes", *Management Research Review*, Vol. 37 No. 9, pp. 791-814.

Alvesson, M. (2004), *Knowledge Work and Knowledge-Intensive Firms*, Oxford University Press, Oxford.

Ancelin-Bourguignon, A., Saulpic, O. and Zarlowski, P. (2013), "Subjectivities and micro-processes of change in accounting practices: a case study", *Journal of Accounting and Organizational Change*, Vol. 9 No. 2, pp. 206-236.

Bart, C.K. (1991), "Controlling new products in large diversified firms: a presidential perspective", *Journal of Product Innovation Management*, Vol. 8 No. 1, pp. 4-17.

Bergeron, B. and Chan, P. (2004), *Biotech Industry. A Global, Economic, and Financing Overview*, John Wiley and Sons, Hoboken, NJ.

Bergqvist, J., Dahlberg, P., Ljungberg, F. and Kristoffersen, S. (1999), "Moving out of the meeting room: exploring support for mobile meetings", in Bødker, S., Kyng, M. and Schmidt, K. (Eds), *Proceedings of the Sixth European Conference on Computer-Supported Cooperative Work (ECSCW '99), Kluwer Academic Publisher, Copenhagen*, pp. 81-98.

Bisbe, J. and Otley, D. (2004), "The effects of the interactive use of management control systems on product innovation", *Accounting, Organizations and Society*, Vol. 29 No. 8, pp. 709-737.

Boden, D. (1994), *The Business of Talk: Organizations in Action*, Polity, Cambridge.

Brownell, P. (1985), "Budgetary systems and the control of functionally differentiated organizational activities", *Journal of Accounting Research*, Vol. 23 No. 2, pp. 502-513.

Cardinal, L.B. (2001), "Technological innovation in the pharmaceutical industry: the use of organizational control in managing research and development", *Organization Science*, Vol. 12 No. 1, pp. 19-36.

Chenhall, R.H. (2005), "Integrative strategic performance measurement systems, strategic alignment of manufacturing, learning and strategic outcomes: an exploratory study", *Accounting, Organizations and Society*, Vol. 30 No. 5, pp. 395-422.

Chenhall, R.H. and Moers, F. (2015), "The role of innovation in the evolution of management accounting and its integration into management control", *Accounting, Organizations and Society*, Vol. 47, No. 1, pp. 1-13.

Chenhall, R.H. and Morris, D. (1995), "Organic decision and communication processes and management accounting systems in entrepreneurial and conservative business organizations", *Omega*, Vol. 23 No. 5, pp. 485-497.

Chong, K.M. and Mahama, H. (2014), "The impact of interactive and diagnostic uses of budgets on team effectiveness", *Management Accounting Research*, Vol. 25 No. 3, pp. 206-222.

Cooper, R. and Slagmulder, R. (2004), "Interorganizational cost management and relational context", *Accounting, Organizations and Society*, Vol. 29 No. 1, pp. 1-26.

Corbin, J. and Strauss, A. (1990), "Grounded theory research: procedures, canons and evaluative criteria", *Zeitschrift Fur Sociologie*, Vol. 19 No. 6, pp. 418-427.

Davila, A. (2000), "An empirical study on the drivers of management control systems' design in new product development", *Accounting, Organizations and Society*, Vol. 25 Nos 4/5, pp. 383-409.

Davila, A. (2005), "The promise of management control systems for innovation and strategic change", in Chapman, C.S. (Ed.), *Controlling Strategy: Management Accounting and Performance Measurement*, Oxford University Press, New York, NY, pp. 37-61.

Davila, A. and Wouters, M. (2004), "Designing cost-competitive technology products through cost management", *Accounting Horizons*, Vol. 18 No. 1, pp. 13-26.

Davila, A., Foster, G. and Li, M. (2009a), "Reasons for management control systems adoption: insights from product development systems choice by early-stage entrepreneurial companies", *Accounting, Organizations and Society*, Vol. 34 Nos 3/4, pp. 322-347.

Davila, A., Foster, G. and Oyon, D. (2009b), "Accounting and control, entrepreneurship and innovation: venturing into new research opportunities", *European Accounting Review*, Vol. 18 No. 2, pp. 281-311.

Dewar, R.D. and Dutton, J.E. (1986), "The adoption of radical and incremental innovations: an empirical analysis", *Management Science*, Vol. 32 No. 11, pp. 1422-1433.

Ditillo, A. (2004), "Dealing with uncertainty in knowledge-intensive firms: the role of management control systems as knowledge integration mechanisms", *Accounting, Organizations and Society*, Vol. 29 Nos 3/4, pp. 401-421.

Ditillo, A. (2012), "Designing management control systems to foster knowledge transfer in knowledge-intensive firms: a network-based approach", *European Accounting Review*, Vol. 21 No. 3, pp. 425-450.

Dyer, W.G. and Wilkins, A.L. (1991), "Better stories, not better constructs, to generate better theory: a Rejoinder to Eisenhardt", *Academy of Management Review*, Vol. 16 No. 3, pp. 613-619.

Eisenhardt, K.M. (1989), "Building theories from case study research", *Academy of Management Review*, Vol. 14 No. 4, pp. 532-550.

Ettlie, J.E., Bridges, W.P. and O'Keefe, R.D. (1984), "Organization strategy and structural differences for radical versus incremental innovation", *Management Science*, Vol. 30 No. 6, pp. 682-695.

Flamholtz, E. (1996), "Effective organizational control: a framework, applications, and implications", *European Management Journal*, Vol. 14 No. 6, pp. 596-611.

Flamholtz, E.G., Das, T.K. and Tsui, A.S. (1985), "Toward an integrative framework of organizational control", *Accounting, Organizations and Society*, Vol. 10 No. 1, pp. 35-50.

Goretzki, L. and Messner, M. (2016), "Coordination under uncertainty: a sensemaking perspective on cross-functional planning meetings", *Qualitative Research in Accounting and Management*, Vol. 13 No. 1, pp. 92-126.

Goretzki, L., Mack, S., Messner, M. and Weber, J. (2018), "Exploring the persuasiveness of accounting numbers in the framing of 'performance' – a micro-level analysis of performance review meetings", *European Accounting Review*, Vol. 27 No. 3, pp. 495-525.

Grafton, J., Lillis, A.M. and Widener, S.K. (2010), "The role of performance measurement and evaluation in building organizational capabilities and performance", *Accounting, Organizations and Society*, Vol. 35 No. 7, pp. 689-706.

Gunnell, J.G. (2003), "The language of democracy and the democracy of language", in Bang, H.P. (Ed.), *Governance as Social and Political Communication*, Manchester University Press, Manchester, pp. 161-178.

Hall, M. (2010), "Accounting information and managerial work", *Accounting, Organizations and Society*, Vol. 35 No. 3, pp. 301-315.

Hansen, A. and Jönsson, S. (2005), "Target costing and coordination: framing cost information sharing in new product development", in Jönsson, S. and Mouritsen, J. (Eds), *Accounting in Scandinavia - The Northern Lights*, Liber and Copenhagen School Press, Kristianstad, pp. 219-241.

Haug, C. (2013), "Organizing spaces: Meeting arenas as a social movement infrastructure between organization, network, and institution", *Organization Studies*, Vol. 34 Nos 5/6, pp. 705-732.

Hayes, D.C. (1977), "Contingency theory of managerial accounting", *Accounting Review*, Vol. 52 No. 1, pp. 22-39.

Hendry, J. and Seidl, D. (2003), "The structure and significance of strategic episodes: social systems theory and the routine practices of strategic change", *Journal of Management Studies*, Vol. 44 No. 1, pp. 1-38.

Henri, J.F. (2006a), "Organizational culture and performance measurement systems", *Accounting, Organizations and Society*, Vol. 31 No. 1, pp. 77-103.

Henri, J.F. (2006b), "Management control systems and strategy: a resource-based perspective", *Accounting, Organizations and Society*, Vol. 31 No. 6, pp. 529-558.

Hernes, T. and Bakken, T. (2003), "Implications of self-reference: Niklas Luhmann's autopoiesis and organization theory", *Organization Studies*, Vol. 24 No. 9, pp. 1511-1535.

Hertenstein, J.H. and Platf, M.B. (2000), "Performance measures and management control in new product development", *Accounting Horizons*, Vol. 14 No. 3, pp. 303-323.

Jarzabkowski, P. and Seidl, D. (2008), "The role of meetings in the social practice of strategy", *Organization Studies*, Vol. 29 No. 11, pp. 1391-1426.

Jordan, S. and Messner, M. (2012), "Enabling control and the problem of incomplete performance indicators", *Accounting, Organizations and Society*, Vol. 38 No. 8, pp. 544-564.

Jørgensen, B. and Messner, M. (2009), "Management control in new product development: the dynamics of managing flexibility and efficiency", *Journal of Management Accounting Research*, Vol. 21 No. 1, pp. 99-124.

Jørgensen, B. and Messner, M. (2010), "Accounting and strategising: a case study from new product development", *Accounting, Organizations and Society*, Vol. 35 No. 2, pp. 184-204.

Kamoche, K. and Cunha, M.P. (2001), "Minimal structures: from jazz improvisation to product innovation", *Organization Science*, Vol. 22 No. 5, pp. 733-765.

Kieffer, G.D. (1988), *The Strategy of Meetings*, Simon and Schuster, London.

Lambert, C. and Pezet, E. (2011), "The making of the management accountant – becoming the producer of truthful knowledge", *Accounting, Organizations and Society*, Vol. 36 No. 1, pp. 10-30.

Lowe, E.A. and McInnes, J.M. (1971), "Control in socio-economic organizations: a rationale for the design of management control systems, (section I)", *Journal of Management Studies*, Vol. 8 No. 2, pp. 213-227.

Luhmann, N. (1986), "The autopoiesis of social systems", in Geyer, F. and van der Zouwen. J. (Eds), *Sociocybernetic Paradoxes*, Sage, London, pp. 172-192.

Luhmann, N. (1990), "Anfang und ende: Probleme einer unterscheidung", in Luhmann, N. and Schorr, K.E. (Eds), *Zwischen Anfang Und Ende: Fragen an Die Pädagogik*, Suhrkamp, Frankfurt, pp. 12-24.

Luhmann, N. (1995), *Social Systems*, Stanford University Press, Stanford.

McDermott, C.M. and O'Connor, G.C. (2002), "Managing radical innovation: an overview of emergent strategy issues", *Journal of Product Innovation Management*, Vol. 19 No. 6, pp. 424-438.

McKinnon, J. (1988), "Reliability and validity in field research: some strategies and tactics", *Accounting, Auditing and Accountability Journal*, Vol. 1 No. 1, pp. 34-54.

Mack, S. and Goretzki, L. (2017), "How management accountants exert influence on managers - a micro-level analysis of management accountants' influence tactics in budgetary control meetings", *Qualitative Research in Accounting and Management*, Vol. 14 No. 3, pp. 328-362.

Malmi, T. and Brown, D.A. (2008), "Management control systems as a package–opportunities, challenges and research directions", *Management Accounting Research*, Vol. 19 No. 4, pp. 287-300.

Messner, M., Clegg, S. and Kornberger, M. (2008), "Critical practices in organizations", *Journal of Management Inquiry*, Vol. 17 No. 2, pp. 68-82.

Miles, M.B. and Huberman, A.M. (1994), *Qualitative Data Analysis: An Expanded Sourcebook*, Sage Publications, London.

Morris, T. and Empson, L. (1998), "Organization and exertise: an exploration of knowledge bases and the management of accounting and consulting firms", *Accounting, Organizations and Society*, Vol. 23 Nos 5/6, pp. 609-624.

Mouritsen, J., Hansen, A. and Hansen, C.Ø. (2009), "Short and long translations: management accounting calculations and innovation management", *Accounting, Organizations and Society*, Vol. 34 Nos 6/7, pp. 738-754.

Nixon, B. (1998), "Research and development performance measurement: a case study", *Management Accounting Research*, Vol. 9 No. 3, pp. 329-355.

O'Connor, G.C. (1998), "Market learning and radical innovation: a cross case comparison of eight radical innovation projects", *Journal of Product Innovation Management*, Vol. 15 No. 2, pp. 151-166.

Otley, D., Broadbent, J. and Berry, A. (1995), "Research in management control: an overview of its development", *British Journal of Management*, Vol. 6 No. 1, pp. 31-44.

Petrova, E. (2014), "Innovation in the pharmaceutical industry: the process of drug discovery and development", in Ding, M., Eliashberg, J. and Stremersch, S. (Eds), *Innovation and Marketing in the Pharmaceutical Industry: Emerging Practices, Research, and Policies*, Springer-Verlag, New York, NY, pp. 19-81.

Preston, A. (1986), "Interactions and arrangements in the process of informing", *Accounting, Organizations and Society*, Vol. 11 No. 6, pp. 521-540.

Revellino, S. and Mouritsen, J. (2009), "The multiplicity of controls and the making of innovation", *European Accounting Review*, Vol. 18 No. 2, pp. 341-369.

Revellino, S. and Mouritsen, J. (2015), "Accounting as an engine: the performativity of calculative practices and the dynamics of innovation", *Management Accounting Research*, Vol. 28 No. 1, pp. 31-49.

Rice, M.P., O'Connor, G.C., Peters, L. and Morone, J. (2009), "Managing discontinuous innovation", *Research Technology Management*, Vol. 41 No. 3, pp. 52-58.

Roberts, J., Sanderson, P., Barker, R. and Hendry, J. (2006), "In the mirror of the market: the disciplinary effects of company/fund manager meetings", *Accounting, Organizations and Society*, Vol. 31 No. 3, pp. 277-294.

Robertson, M. and Swan, J. (2003), "Control – what control? Culture and ambiguity within a knowledge intensive firm", *Journal of Management Studies*, Vol. 40 No. 4, pp. 831-858.

Rockness, H.O. and Shields, M.D. (1984), "Organizational control systems in research and development", *Accounting, Organizations and Society*, Vol. 9 No. 2, pp. 165-177.

Rockness, H.O. and Shields, M.D. (1988), "An empirical analysis of the expenditure budget in research and development", *Contemporary Accounting Research*, Vol. 4 No. 2, pp. 588-594.

Rothaermel, F.T. and Deeds, D.L. (2004), "Exploration and exploitation alliances in biotechnology: a system of new product development", *Strategic Management Journal*, Vol. 25 No. 3, pp. 201-221.

Schwartzman, H.B. (1989), *The Meeting: Gatherings in Organizations and Communities*, Plenum, New York, NY.

Simon, H. (1997), *Administrative Behavior: A Study of Decision-Making Processes in Administrative Organizations*, 4th ed., Free Press, New York, NY.

Simons, R. (1990), "The role of management control systems in creating competitive advantage: new perspectives", *Accounting, Organizations and Society*, Vol. 15 Nos 1/2, pp. 127-143.

Simons, R. (1994), "How new top managers use control systems as levers of strategic renewal", *Strategic Management Journal*, Vol. 15 No. 3, pp. 169-189.

Simons, R. (1995a), *Levers of Control: How Managers Use Innovative Control Systems to Drive Strategic Renewal*, Harvard Business School Press, Boston.

Simons, R. (1995b), "Control in an age of empowerment", *Harvard Business Review*, Vol. 73 No. 2, pp. 80-88.

Svennevig, J. (2012), "Interaction in workplace meetings", *Discourse Studies*, Vol. 14 No. 1, pp. 3-10.

Taipaleenmäki, J. (2014), "Absence and variant modes of presence of management accounting in new product development - theoretical refinement and some empirical evidence", *European Accounting Review*, Vol. 23 No. 2, pp. 291-334.

Thunus, S. (2016), *Meeting in Brackets*, University of Liège, Liège, 12 May.

Tuomela, T. (2005), "The interplay of different levers of control: a case study of introducing a new performance measurement system", *Management Accounting Research*, Vol. 16 No. 3, pp. 293-320.

Ullrich, M.J. and Tuttle, B.M. (2004), "The effects of comprehensive information reporting systems and economic incentives on managers' time-planning decisions", *Behavioral Research in Accounting*, Vol. 16 No. 1, pp. 89-105.

Vaivio, J. (2006), "The accounting of 'the meeting': examining calculability within a 'fluid' local space", *Accounting, Organizations and Society*, Vol. 31 No. 8, pp. 735-762.

von Zedtwitz, M. and Gassmann, O. (2002), "Market versus technology drive in R&D internationalization: four different patterns of managing research and development", *Research Policy*, Vol. 31 No. 4, pp. 569-588.

Appendix 1

Interviewees	Date	Duration of interviews	Tape-recorded
DrugCorp			
CEO/Project Manager	27 September 2005	1 h 55 min	1 h 20 min
CEO/Project Manager	25 October 2005	1 h 30 min	1 h 21 min
Director of R&D/Project manager	25 October 2005	1 h 20 min	1 h 23 min
CEO/Project Manager	14 November 2005	1 h 22 min	1 h 11 min
Director of Business Development	14 November 2005	1 h 10 min	1 h 1 min
CEO/Project Manager	10 January 2006	1 h 35 min	1 h 23 min
Director of Business Development	10 January 2006	1 h 10 min	1 h 29 min
Director of R&D/Project manager	10 January 2006	45 min	42 min
CEO/Project Manager	27 January 2006	1 h 35 min	1 h 30 min
Director of R&D/Project manager	27 January 2006	35 min	29 min
CEO/Project Manager	13 April 2006	2 h 0 min	1 h 52 min
CEO/Project Manager	6 June 2006	1 h 10 min	48 min
CEO/Project Manager (follow-up)	April/May 2009	*By e-mail*	
Total	12 interviews	16 h 7 min	14 h 29 min
TestCorp			
CEO	20 October 2005	1 h 39 min	1 h 9 min
R&D Manager	30 November 2005	1 h 5 min	1 h 0 min
Production Manager	30 November 2005	40 min	26 min
Export and Marketing manager	30 November 2005	25 min	21 min
Head of Quality Control	30 November 2005	1 h 10 min	1 h 1 min
Head of Quality Control	12 January 2006	1 h 0 min	46 min
R&D Manager	12 January 2006	1 h 10 min	1 h 6 min
Head of Quality Control	4 April 2006	40 min	32 min
R&D Manager	4 April 2006	1 h 30 min	1 h 7 min
CEO	5 April 2006	45 min	34 min
R&D Manager	20 April 2006	1 h 30 min	1 h 25 min
Head of Quality Control	20 April 2006	40 min	34 min
R&D Manager	6 June 2006	1 h 0 min	51 min
Head of Quality Control	6 June 2006	30 min	23 min
Total	14 interviews	13 h 44 min	11 h 15 min
Total	**26 interviews**	**29 h 51 min**	**25 h 44 min**

Table AI.
Interviews

Appendix 2

Table AII.
The system of meetings in DrugCorp

Regular meetings	Frequency	Degree of structure	Meeting purpose, related reports, and participants
Board meetings (A)	Every 6 weeks	Highly structured	Purpose: strategic management Participants: board and invited guests
Management team meetings(B)	Monthly	Highly structured	Purpose: discussion of financial reports, budgets, project activities based on project update reports, R&D, intellectual property rights, operative plans, and action plans Participants: CEO and department managers
Project management meetings(C)	Quarterly	Highly structured	Purpose: performance management, discussion of project objectives and tasks emphasizing the key issues (breakdowns/problems), budgets, competition, and commercialization Participants: CEO, project managers, and director of business development
Operational meetings(D)	Quarterly	Highly structured	Purpose: discussion of the performance and ongoing issues from cost centers' perspective and budget comparison Participants: CEO, heads of the six cost centers, laboratory head, and project managers
Staff meetings(E)	Every 2-3 weeks	Highly structured	Purpose: sharing and dissemination of information to employees Participants: all employees
Research (i.e., drug discovery meetings)(F)	Every 2-3 weeks	Structured	Purpose: discussion of performance and possible problems in drug discovery Participants: R&D department employees, research director, and managers of development projects
Chemists' meetings(G)	Every 2 weeks	Structured	Purpose: performance evaluation of projects and identification and discussion of chemistry-related problems Participants: chemists, project manager
Meetings with external expert panel(H)	Annually	Structured	Purpose: performance evaluation of drug development projects Participants: top managers and scientific board of professionals from other institutions

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