



Deviations and the breakdown of project management principles

Project
management
principles

Markus Hällgren

Umeå School of Business, Umeå University, Umeå, Sweden, and

Eva Maaninen-Olsson

*Tepper School of Business, Carnegie Mellon University, Pittsburgh,
Pennsylvania, USA*

53

Received 6 May 2008
Accepted 28 August 2008

Abstract

Purpose – The purpose of this paper is to contribute to the understanding of how unexpected events (deviations) are handled and how the limited time available in a project affects the possibilities for reflection and knowledge creation. Since deviations will inevitably occur and they will substantially increase project costs, studies of them are imperative. When only a fraction of the project management literature has focused on the actuality of the project this study gives insights into the practice of project management.

Design/methodology/approach – The study is based on an exploratory, in-depth case study of a power plant project found in an integrated provider of projects of this type. The projects were followed by participative observations during ten weeks of onsite visits.

Findings – The results show that in contrast to contemporary project management theories, the management of deviations was found to be primarily informal. The reason for this was two-fold. First, there was not enough time to use formal procedures. Second, if the formal routines were to be followed, the window of opportunity would be lost, making the decisions that follow useless. Third, two types of reflection were noted: *structured collective reflection* and *contextual reflection*, the former corresponding to formal routines and the later to the solution of deviations which is seen as a trigger for spreading practices around the organization.

Research limitations/implications – The research presented that projects should be studied from a practice point of view, where deviations might be a good starting point. Moreover, it is suggested that there is a need to broaden the studies of reflection to accommodate other organizational levels and time spans.

Practical implications – The case has several suggestions for practitioners. First, small deviations should be paid attention to. Second, bureaucracy hampers flexibility and the organization should rather set up organizational structures, i.e. dual structures, to allow for a smoother process. Third, networks and confidence were found to be essential for the process. Finally, there is a need to pay attention to different time frames when managing deviations.

Originality/value – The paper develops a more intricate view of project organizing coming from the new Project-as-Practice agenda. Rather than focusing on what should be done, it focuses on what is done, which is a research area that needs further attention.

Keywords Project systems, Project management, Control systems, Reflection, Materials handling

Paper type Case study

The authors gratefully acknowledge the helpful comments from two anonymous reviewers. Furthermore, this research would have not been possible without the support of Research Institute for Project Based Industry (PBI) which gave access to their invaluable contacts and data. The authors also acknowledge the financial support from the Swedish Council for Working Life and Social Research. Last, but not least, the authors would like to thank those men and women at Power Solutions whose lives were studied during some cold months in the middle of the northern winter.



Introduction

Traditionally, projects within contemporary business are perceived as planned and controlled where unplanned events can be managed with appropriate planning tools and methods (Nicholas, 2001; PMI, 2004). If these tools and methods are used when planning the project, it is believed that it will meet the set budget and time requirements. However, despite efforts to plan and control, deviations of different sorts arise in projects and cause organizations cost overruns (Standish Group, 1995). Deviations are inevitable, according to Perrow (1999), due to the complexity of interrelations in a system or a project. To manage these situations proactive project managers use methods and tools related to risk. Being reactive, they apply change and control measures. However, these tools and methods do not describe what actually happens when a deviation occurs. That is, they do not describe the actions and the actuality of the projects, only what is considered to be the appropriate procedures.

This leads to the aim of this paper which is: to analyze, deepen and strengthen the understanding of how deviations are managed in practice in relation to the use of control methods and a reflection point of view. In order to understand deviations in practice (that is, what people do), as opposed to theory (that is, what people aspire to do), this paper uses and extends upon a Project-as-Practice-based approach where activities and people matter (Schatzki *et al.*, 2001; Reckwitz, 2002). In order to understand the managing of a project there is a need for a wider perspective than the project *per se*, encompassing organizational, individual and technical aspects (Cicmil, 2005).

The paper is organized as follows: it begins with the general theoretical framework and a discussion of the traditional project management literature, followed by the concept of deviations. An alternative way of understanding the organizing of projects is then presented, where time, reflection, and participation are key concepts. After the theoretical framework and methodological considerations are discussed the studied case is presented and analyzed. The paper ends with concluding remarks and with suggestions for both academics and practitioners.

Theoretical framework

Project management

An essential feature of project management is its ability to get things done. Project management is aligned with the notion of explicit and mechanistic control, and is output-based (Hodgson, 2004). A contributing variable is the limitations of the iron triangle of scope, time and resources. Assuming that these boundaries are limited there is a need to focus on what is to be accomplished. One reason for the popularity of project organizations is thus that it arguably increases organizational control as the task is restricted, and thus limits wasteful use of resources, but it also increases the focus on action (Ekstedt *et al.*, 1999). The definition of a project states that it is supposed to accomplish a transition, and action is a means to accomplish this. Action implies that the project represent a way to organize activities with flexibility and adaptability, which is a second reason why the organizing of projects has become popular (Sahlin-Andersson, 2002).

One of the main characteristics of a project is that it is considered to be unique: that is, the project is supposed to have a unique task or solution. The unique task or solution implies that there are no ready-made solutions, and this in turn causes a

degree of uncertainty in the project. The uncertainty is managed by planning in the different phases of the project, which suggests that there is an assumption about a linear rationality. It is expected that the project will proceed through some basic phases including setting up some assumptions, planning, execution and delivery of the product/service. Through the use of a “Work Breakdown Structure” the task is structured and the activities become visible, isolated and easier to manage. The objective of the work breakdown is to “reduce the project into work elements that are so clearly defined that they, individually, can be thoroughly and accurately defined, budgeted, scheduled and controlled” (Nicholas, 2001, p. 165). By breaking down the task into work packages it is possible not only to create plans involving time and cost estimates but also assign management and task responsibility.

Arguably every project has a plan and changes that happen during the course of the project are managed through integrated change control (PMI, 2004). Control is furthermore obtained by various tools and methods including: earned value, information systems, expert judgments and formal and informal project management methodology (PMI, 2004). These tools and methods are used in order to deliver on time, on budget and to assure that the delivered product/service meets the requirements set at the beginning of the project. PMBoK (PMI, 2004) recognizes four main control techniques: formal and informal procedures, information systems, earned value, and expert judgments, while the main idea of risk management is setting standards, comparing and corrective actions (Nicholas, 2001).

The access to different tools and methods creates an illusion of the project as being planned and executed in a controllable manner. However, although the planning and the use of formal tools and methods are used, there will always be deviations that need to be managed (Hällgren and Maaninen-Olsson, 2005). Unexpected situations (deviations) are problematic and require a lot of effort on behalf of the project manager, as Dvir and Lechler (2004, p. 1) argue, “plans are nothing, changing plans is everything”. The conditions for the plan will change and the project has to adapt. Therefore, project management as a field, is close to obsessed with planning and risk. Kloppenborg and Opfer (2002, p. 21) found that 29 percent of 3,554 project management articles deal with planning, 23 percent with control, in comparison to only 1 percent which consider the implementation and execution phase of the project. Thus, there is a large potential gap between what is studied and what actually happens in the project, a gap which this paper addresses.

Management of deviations

Although projects are by nature considered unique (Nicholas, 2001), during execution there are also repetitive tasks. These repetitive tasks can be managed through the use of project management methods and tools, which imply that the execution of a project can be achieved on the basis of a general structure (Nicholas, 2001). The general structure (the plan) assumes that the tasks can be predetermined. However, deviations, defined as unexpected events which are not according to the expectations of one or several people cannot, by definition, be predetermined (then they would be expected). Deviations may be different in terms of being bolts from a blue sky, duration, direction, etc. but altogether they are definitely not according to the expectations (and mostly the plans) (Kylan, 1985; Weick and Sutcliffe, 2001). Deviations are part of the practice where unexpected events will occur sooner or later due to lack of independence

between the components of the system. The answer to how to manage these situations has been to increase planning, add redundancy, and decrease the dependency between the components of the system or project, but neither is enough even in a extremely highly controllable environment (Perrow, 1999).

However, instead of understanding the management of the unexpected in an instrumental way with increased planning, use of tools and methods, etc. we suggest that the management of deviations needs to be understood from an organizing point of view. First, when looking at the project from an organizing perspective it can be understood as a non-linear process (Lundin and Söderholm, 1995), where things happen between the start and end of the projects. When unplanned things start to happen there is the risk that the iron triangle falls apart, and the actions of the project participants are not organized according to the predetermined procedures (Hällgren and Maaninen-Olsson, 2005), but rather according to a improvisational pattern (Lindahl, 2003). However, typically improvisation focuses on the interplay between plan and action and leaves out the more fine-grained micro-organizing features of every day actions leaving out on the interplay between praxis, practices and the practitioners.

In line with this argument, it has been shown that management of the unexpected is often a trial and error endeavour with some basic structures. Engwall and Svensson (2004) suggest that cheetah teams can be useful. These are *ad hoc* teams which are gathered to solve a specific problem. Hällgren and Wilson (2007) suggest that an organizational dual structure is beneficial and Loosemore (1998) that communication is essential. Taken together, these suggestions imply that the practice of project managers may provide a greater understanding of what happens when handling deviations. This approach have been called a "Project-as-Practice" approach (Hällgren, 2007; Hällgren and Wilson, 2007; Söderholm, 2008).

Project-as-Practice is part of a larger turn in society with a common interest for the micro level of organizing (Schatzki *et al.*, 2001). Other areas that have been influenced includes ethics (Clegg *et al.*, 2007), management accounting (Ahrens and Chapman, 2007), problem solving (Orr, 1996), institutional theory (Seo and Creed, 2002; Hallet and Ventresca, 2006), knowledge (Brown and Duguid, 1991; Gherardi and Nicolini, 2000; Wenger, 1998) and strategy (Johnson *et al.*, 2003; Jarzabkowski, 2005; Whittington, 1996, 2006).

Three concepts are central from for a Project-as-Practice analysis, the practitioners (e.g. the project manager); their praxis (their situated actions); and the practices (norms, values, rules, experience, etc.) that the project managers draw upon when carrying out their praxis. These concepts are essential if we are to understand what is happening within the project (Johnson *et al.*, 2003; Blomquist *et al.*, 2006; Jarzabkowski *et al.*, 2007; Whittington, 2006). Not all concepts need or can be in focus for an Project-as-Practice analysis, but they will inevitably be touched upon as they are intertwined (Whittington, 2006, p. 620). Essentially Project-as-Practice focuses on what people are doing in line with Weicks (1979, p. 44) famous credo of "stamping out the nouns" and replaces the nouns with verbs and gerunds. Such a perspective reveals the inner secrets of project management, the intricate details, the nitty gritty work of projects, and the mundane management tasks, which together create what is to become a finished project.

Time and reflection

Taking a Project-as-Practice perspective when looking at how deviations are managed, suggests that project execution is about creating and utilizing knowledge, rather than just being a process of implementation (Engwall, 2002; Hällgren and Maaninen-Olsson, 2005). When facing a problem, i.e. a gap between what an agent knows and what it needs to know, a cycle of knowledge processing is initiated, whereby new knowledge is produced (Firestone and McElroy, 2003). Knowledge is understood as something that is created and shared through participation and in practice (Gherardi, 2000; Scarbrough *et al.*, 2004). The needed information and knowledge is shared and created both within the focal project (Lindqvist, 2005) as well on the boundaries of the historical and organizational context of the project (Engwall, 2002; Maaninen-Olsson, 2007). Several studies have shown the possibilities and advantages that arise from sharing knowledge between projects (Brady and Davis, 2004; Ancona and Bresman, 2006; Maaninen-Olsson, 2007). However, as projects are time limited, with a specific start and end, the sharing and creation of knowledge becomes challenging for the project team (Newell *et al.*, 2006; Maaninen-Olsson and Mähring, 2008). In addition, the time pressure affects the possibilities of searching for the right information, and the required reflections to make that information or knowledge actionable contributes to limited learning initiatives within and between projects (Ayas, 1998).

Besides, the time needed to search for a solution, there must be time for reflection to create knowledge. Reflecting on and challenging your assumptions are prerequisites for innovation processes and performance (Spear and Bowen, 1999). Scarbrough *et al.* (2004, p. 495) understand reflection as “the process by which individuals and groups make their prior and implicit knowledge more explicit to themselves and to each other through activities based on review and self-diagnosis”. Through reflexive practices in communities the actors can, in collaboration, reflect over their tasks and other related issues, and thereby understand how their work affects other conditions, whereby a holistic understanding of the situation at hand is developed (Cicmil, 2005). By articulating and comparing perspectives between colleagues, organizational members can improve the way of making sense of the situation at hand and the actions that are required (Zollo and Winter, 2002). This process of sense making and situational awareness facilitates the handling of different tasks (Wiig, 2004). However, in spite of these positive outcomes other studies have shown the difficulties the project team faces in creating time for reflection (Keegan and Turner, 2002; Maaninen-Olsson and Mähring, 2008). All in all, we suggest that this approach would correspond to “structured collective reflection” which is more pre-organized compared to a more *ad hoc* improvisation based reflection practices.

Methodology

Methodologically, there have been several calls for more interpretative and action-oriented in-depth *empirical* research into the study of projects (Cicmil *et al.*, 2006). To date, relatively few scholars have taken up this challenge. The findings reported in this study are based on a qualitative in-depth longitudinal case study conducted at a power plant construction project. A case study is preferable when conducting exploratory research or when refining existing theory (Eisenhardt, 1989). When conducting a case study the focus is on process and context rather than on results and specific variables (Merriam, 1988). The chosen method made it possible to

undertake a longitudinal study, which was seen as an advantage in order to understand how deviations were handled during the execution of the project. The value of having just one case lay in its ability to gain an in-depth understanding of the studied phenomenon. The projects were chosen on the following criteria. First, the power industry is project intensive, and the managing of deviations is imperative for the success of companies. Secondly, power projects often face a dilemma as they are repetitive projects that at the same time require customization. In addition to being time-limited, deviations cut across responsibilities, operations, organizational borders and geography, making their management complex. For reasons of confidentiality, the studied firm is referred to hereafter as *Power Solutions*.

In order to understand what actually happens during the course of the project, there was a need to examine the project as a process. A process approach gives the means to “catch reality in flight, to explore the dynamic qualities of human conduct and organizational life” (Pettigrew, 1997, p. 347). Compared to a retrospective study, where the things that happen have a tendency to be re-evaluated and there is a risk that the history is made to suit different stakeholders, a process approach gives an opportunity to be part of the process.

Observations were the main method chosen and they followed the project team during its execution phase. Apart from observations, in-depth interviews were made. The observations and interviews were supplemented with email, official organizational and project documentation, including plans, contracts and minutes of meetings. The empirical data was continuously interpreted by using the theoretical framework, where the theoretical framework functioned as an input to a theoretical analysis of the empirical data. During the analysis, the theoretical framework was modified and refined in order to interpret the empirical data correctly. The purpose of the theoretical frame of reference was to focus attention on important aspects of the managing of deviations. Moreover, quotations were used in order to emphasize important points and issues and shed light on the research question.

Power solutions – an introduction

Power Solutions is one of the leading providers of decentralized power solutions in the world. Divided into several divisions the power plant division manages more than 100 parallel projects, ranging from delivery projects to turnkey projects, executed over a period of 3-24 months with an average on 9-12 months.

At *Power Solutions*, the turnkey projects were organized with one project team at the corporate office, reporting to the line and division management, and one site team at the building site. The project team was responsible for the planning, engineering, purchasing, supply, logistics, execution support, customer contacts, and guarantee issues. The site team was responsible of the execution of the project. For this study, the observations were made on the project team.

Project teams at *Power Solutions* commonly consisted of four members for a turnkey project: a project manager, an electrical engineer, a mechanical engineer and a civil engineer. Various in-house resources were available to the team. The studied project was designed to produce 13 megawatts of electricity for a paper mill client, which was considered a small project. The planned execution required eight months. In total the project and the project team was followed for a period of 11 weeks and the specific deviation was observed over eight weeks.

The case

The focus of this study is the neglected execution/implementation phase of the project (Kloppenborg and Opfer, 2002). At the time of the study the project was in the end of its construction phase and the beginning of the installation and implementation phase. The installation refers to a technical task where the project puts equipment and software in place, while implementation refers to a socio-technical task that includes installation but also aims for a system in use.

The site team was initially waiting for the transport of some major equipment necessary for the progress of the work. As a consequence, of the transports being delayed for some time, progress slowed down and the logistics company was held responsible. Finally, by the time of delivery, one deviation that had a major impact on the execution was discovered; the goods that had been delivered were found to be damaged upon arrival to the site. The site team instantly reported to the project manager in a Sunday email. On Monday morning the project manager was noticeably worried about the situation as the equipment that was believed to be damaged had a long replacement time, up to three months including logistics. The project manager promptly started to investigate what was damaged and what could be done.

Initially the project manager spoke informally to the site team, but they did not have any additional information. As there was a similar project close by that shared some resources with the studied project, the project manager sent an available junior engineer to investigate, take photos and document the incident. By Tuesday, barely a day after the initial report on the incident, it was determined that the equipment would most likely be unusable. When the project manager finally reached the insurance company after repeated attempts by phone and e-mail, they could not give him a certain answer on the reimbursement issue:

“We have to order now! Otherwise we will pay ourselves silly in fines!” He listened for a while and repeated his plea: “I understand that you can’t give me an absolute answer but I tell you once again, we have to order now!”

Upon finishing the call, the project managers turned to the mechanical engineer and told him to order the damaged material, following up this instruction later with an email:

I understand that the two MV switchgear cubicles are so badly damaged that we need to supply new ones. Please act accordingly to not lose more time (Email 050119).

It was not until after the decision to order the damaged parts that a formal letter was sent regarding the issue. From the moment that the deviation was reported the activity level had been extremely high for the project manager. He had been more or less constantly occupied – engaged in phone, email or face-to-face conversations with various functions in the organization including the division management. Many of the phone calls and the emails were sent to the sub-contractors responsible for the project logistics, since they were considered responsible for the incident according to the information available at the time.

A week later some equipment was again found to be damaged upon arrival, and the project manager was on the phone with the owner of the Logistics Company. This time the material was not as crucial for the project, and could be replaced on site. The situation was however not less disturbing as it created confusion and anxiety among the project members at the site and at the corporate office.

According to the Logistics Company they did not have any part in either of the situations as they, to their knowledge, had not dropped any of the damaged equipment, and they did not initially know how the damage occurred. After some further investigation an Email arrived to the project manager. The Email reported that the equipment had been loaded already damaged, that the company had forgotten to report it, and that they were very sorry. By reading this the project manager explained to the logistics subcontractor:

They have been damaged for months and no one has said anything to me! [. . .] This will delay the entire project!

Apart from advising the division management informally, there were also monthly report meetings and the pre-meeting reports. However, these contained only a brief summary of the situation and did not contain any decisions or hints. About two weeks after the initial banter the situation calmed down. However, the situation was still evolving and information was being added to what was already known. Among other things a report was sent from an independent logistics consultant employed by the logistics company. This report was considered flawed and the project manager responded with an internal email to a claim person stating:

A lot of bull.shit, make our report as I asked for in my earlier email (Email 050215).

The situation was discussed in various emails – each party blaming the other – and unfortunately, events ended up in a claim on the logistics company. In a written complaint about the damage as well as the delays, he demanded half the amount of the transportation fee in damage. However, there was no basis for such a complaint in the contract – leaving the resolution of the problem to the goodwill of the logistics company which had worked extensively with *Power Solutions*.

Six weeks after the discovery of the damaged equipment the logistics company and the project manager met in a conference room at *Power Solutions*. They discussed the issue and the amount of the claim was made official. No official change request was made during the entire process.

Risk and change management procedures made explicit

At no time during the entire process was there any formal risk management method applied or documented. Nor were there any formal change management procedures on paper. The process that developed was only evident in the emails and the conversations that were held both over phone and in private. It is also notable that seven change orders were filed during the 11-week period, all involving the construction subcontractor without mentioning the major equipment deviation. The closest to a change order procedure that was found was the official claim that was subsequently filed and sent over to the logistics firm.

Results

The aim of this paper was to analyze, deepen and strengthen the understanding of how deviations are managed in practice in relation to the use of control methods and a reflection point of view. We have chosen to make these reflections in accordance with a Project-as-Practice perspective, focusing on the actions of a project manager.

Informal deviation handling vs formal control methods

Project management in general is quite formal – the emphasis for control methods is on formal procedures earned value, for example (Nicholas, 2001). The soft side of project management is recognized in communication as one of the cornerstones in the PMBoK (PMI, 2004). However, communication is not recognized as a means for handling changes, risks and deviating situations, but rather it is thought of as keeping various stakeholders pleased.

Perrow (1999) suggested that tightly coupled complex organizations inevitably face deviations which require management attention. We do not suggest that our case is of Perrow's magnitude although it is a tightly coupled project where deviations need attention. Nevertheless, examining the case, it is evident that the studied deviation was one of the major events of the project's life cycle. Even though the appropriate planning methods and the breakdown were done according to the rules and routines of project management and of the organization, the project could not evidently be protected against the deviation, in this case, the damaged equipment. According to the customary tools and methods the deviation should have been handled through formal procedures and the filing of various reports in order for a decision to emerge (Nicholas, 2001). Instead, the project handled the deviation informally. By informal is meant a procedure which is not made explicit in a report or a plan.

The most prevalent way of managing the deviation was not by following formal procedures. Rather it was found in the various types of conversation that were applied. Even though email nowadays arguably can be treated as a semi-formal method with evidence value, it can hardly be argued to be a part of what is normally considered as change management procedure as described in the PMBoK (PMI, 2004) (Table I).

The handling of the deviation was focused on immediate problem-solving and action, and only to a limited extent on proper decision-making procedures as described in Nicholas (2001). The project manager for instance initially recognized the need for action when talking with the insurance company even though he did not have full knowledge about the situation. This process is partly covered by Lundin and

Development	According to rules and methods	Management
The deviation	Risk management procedure	Email
Initial investigation	Risk management procedure	Conversation with site team Junior site engineer
Insurance	Claim Change management procedure	Phone call Email Claim
Order	Change management procedure	Conversation Email
General discussion	Formal procedures	Email Phone
Reason clears	–	Email Phone
Damage report	–	Email Report
Meeting	Minute of meetings Informal and formal procedures	Minute of meetings Informal and formal procedures

Table I.
Deviation development
and theoretical and
management

Söderholm's (1995) theoretical article and their argument for action in project organizations.

However, where they focus on the project as such, this paper focuses on a single activity. In this paper, it is shown that it is obviously applicable to single deviations within a project too. The need for the project to be finished on time is reflected in every part of the project.

The results of the study reveal that the classical tools and methods seem not to be flexible and fast enough. If a certain deviation is handled via the use of the change control tools before the solution is implemented, it is likely that the deviation during this time either has become more severe or is circumvented. In this case, informal handling was thus not an answer. It was rather a matter of informally managing the deviation in order to meet the need for speed in taking action. The deviations were handled formally through a formal notice on only a few occasions. However, the formal notices that were made were for the most part used as summaries of what has been discussed and not for decisions that the company's routines require to be filed, as discussed by Nicholas (2001) and PMBoK (PMI, 2004). When the formal reports were written, it was because of the rules and routines that were set within the organization. The formal reports were thus filed as requirements. The monthly reports were an in-house routine that everybody had to follow, but which reported on past events and their solutions. These monthly reports were written and handled formally, but they did not fully cover information about the deviation. They covered only information about events up to the time of writing the monthly report. This was because of the delay between the events and the monthly reports and the following meeting. There was no formal follow-up about the information received in the monthly reports, and therefore these formal reports could be understood as simply informing the involved parties rather than as a point of departure for a decision. The out-of-house reports, for example, the notice sent to the insurance company – were contractual obligations and not formal tools for decisions on the project. Evidence for this conclusion is found in the filed claims and formal reports as well as their formal use. They are set out in Table II.

Following this argument, communication becomes increasingly important and needs to be studied further. Moreover, the explicit tools and methods described in the project management handbooks and articles need to be complemented by studies on the execution of the project and the ongoing practice of project management. The impact of time also needs further attention to understand the various actions within the project.

Reflection under strict constraints

Having analyzed the role of informal methods in the handling of deviations we turn to the role of reflection, where reflection is understood as a knowledge process (Scarbrough *et al.*, 2004, p. 495). Arguably, reflection is best done in communities in

Table II.
Formal reports, claims
and their function

Reports and claims	Function
Formal notification to insurance company	To notify and meet the demands of the contract
Final claim	To notify about position
Monthly reports	To inform the management, obligatory according to organizational routines

order to develop a more holistic view (Cicmil, 2005) of the event, and this approach would correspond to what we call structured collective reflection. This implies that there needs to be time set aside for reflection, but similar to other studies of project environment our findings suggest that it is not a practice that is prevalent. However, the impact on the project and on organizational efficiency of losing these opportunities is often underestimated within the organization (Maaninen-Olsson and Mähring, 2008).

The case highlights the importance of the time perspective. As in the previous discussion, the concept of action (Lundin and Söderholm, 1995) is important to understand the way deviations are handled. The limitation in time made action necessary, but action was to a less degree about finding new knowledge and more about relying on previously gained knowledge to reach “good enough” solutions. The case showed that the experience of the project manager was important in both how contacts were achieved and how the *ad hoc* temporary deviation solving team was set up. Structured collective reflection through participation was something that was not found to a high degree in the studied project. When reflection did occur, it was in short bursts and seen in spontaneous discussions involving two or three actors. It is hard to comment on individual cognitive reflection, but structured collective reflection was not something for which the project manager seems to have made time.

The reflection aspect in the managing of the deviation seems to be more coincidental than organized and more reliant on the contacts of the persons involved. The reflection that seems to have been done collectively is the one that is connected to how to find an expeditious “good enough” solution. It is a process of making sense of the situation at hand and being aware of the consequences of it (Wiig, 2004). The reflection that was done was done informally, and it was further most individual rather than collective. This would correspond with the lack of use of formal tools for managing change. The formal reflection that was found was in the monthly reports that, even though they were extremely brief, reported on the event and what measures that had been taken. Formal reflection in risk and change management procedures was thus not something that was necessary for the solution. There is of course, a risk that lack of collective reflection in communities (Cicmil, 2005) leads to a lack of knowledge creation within the organization (Gherardi, 2000; Scarbrough *et al.*, 2004) and thus, as Ayas (1998) concludes; knowledge creation in projects is problematic. Arguably, this is a feature of projects. Consequently, this study, together with other studies of structured collective reflection through participation, shows the value of focusing on the creation of a reflection “push” effect rather than a reflection “pull” effect reached in organized formalities given in, for example, formal reflection, tools, methods and reports.

Consequently, solving the issue of the need for reflection would seem to be accomplished by contextually sensitive “push” reflection based in the present rather than a structured collective “pull” reflection. The former approach, which we call *contextual reflection*, spreads the practices which reflection contributes to by allowing certain practitioners around the organization to organize themselves around common issues, such as deviations (Whittington, 2006). By engaging in mutual praxis (actions) the practitioners builds understanding and practices (norms, values, rules, “the way things are done”) which in a later stage is utilized in similar situation in other situations and projects. Thus, deviations are not necessarily something bad. They are rather triggers for development of practices.

Conclusions

This paper is based on a study of a single activity. Only one of all the deviations that happened in the project was studied. This was done in order to get an in-depth understanding on how deviations are handled. The study of activities gives a greater knowledge of the actuality of the project (Cicmil *et al.*, 2006) and therefore how deviations are managed can be better discerned. Through this exploratory study we have highlighted the shortcomings of contemporary project management's tools and methods when managing deviations, and concentrated on the concept of reflection and the time limitation of projects.

According to Dvir and Lechler (2004) deviations will inevitably happen and the project has to adapt to these deviations. Despite the effort that is put into reducing the number of deviating events they remain very expensive for projects (Standish Group, 1995). These changes and risks, as large impact deviating events are called in the contemporary project management literature, are commonly treated as what should be done rather than what is done (PMI, 2004; Nicholas, 2001). They describe recipes for how an event should be either circumvented or handled if all the bits and pieces come together. Drawing upon contemporary literature it is suggested that deviations are a fruitful concept to develop, investigate and analyze in order to further understand the procedures of project management. Furthermore, it seems that participative observations are an especially good method to catch the process on the fly while retrospective studies gets a rationalized view of the process.

As this case has shown, not even deviations with a major impact receive the attention that is considered proper project management behavior (Nicholas, 2001; PMI, 2004). There are thus a gap between theory and practice. As the case has shown, the handling of deviations was mostly informal and it is suggested that focus should be on what is happening, rather than on the tools and methods in order to develop both an understanding of deviations and an efficient project organization.

In this case, the reason for the use of informal handling instead of formal tools and methods is found in the time limitation that is inherent in a construction project. The time limitation not only affects the control methods, but also how a deviation is reflected upon. The lack of time influences the opportunities for both individual and collective reflection, where the project members' prior knowledge is made explicit through participation whereby new ideas and knowledge can be created. This paper has shown that there is not time for structured collective reflection, and the reflection that does occur is mostly coincidental and informal involving only one or, occasionally, a few actors. It could be argued to be a result out of the mindset of the project manager (Spear and Bowen, 1999), but rather we conclude that it is a result of the time pressure that exists when managing deviations. Nevertheless, the contextual reflection is reflected in the dual structures that are present in the case with the site, project and line/service organization cooperating together to resolve the situation.

Although our study has important theoretical and practical implications it should be noted that there are limitations to the presented results. Single-case studies are frequently criticized due to the lack of ability to make generalizations from them. However, our aim is not to generate statistical, but rather analytical generalizations (Yin, 2003). The results are not only based on the case, but also on theoretical contributions from earlier studies. Furthermore, theory-informed "rich insight" from

single-case analysis constitutes a valid and adequate form of generalized knowledge (Lee and Baskerville, 2003). Still, our findings have to be assessed and used with some caution depending on context and conditions: while we aim to develop generalized theoretical statements, additional studies that add variety in contexts and conditions would certainly be beneficial.

Practical and theoretical implications

This paper brings forward a number of contributions to the contemporary theoretical debate on projects as well as a range of implications for practitioners. First from a theoretical perspective, project management needs to be studied from a practice point of view, which calls for case studies and participative observations. Secondly, to be able to understand the processes of a project, there is a need to go beyond risk, change and control management. The concept of deviations does this, and contributes to a more in-depth understanding of events doomed to happen, and how they are managed. A more elaborate investigation into these specified areas of research is thus proposed. Thirdly, reflection in a project environment seems to be problematic and does not add up to what is described in the literature so far. One explanation might be the focus of the organization. Activities carried out in projects (Cicmil *et al.*, 2006) and in more permanent settings (Spear and Bowen, 1999) differ from each other, and thus offers different opportunities for learning and innovation (Lindqvist, 2005). Another possible explanation for this could be how reflection is promoted from the top-management (i.e. Maaninen-Olsson, 2007). There is thus a need for further studies, in different settings, analyzing the mechanisms of reflection under time constraints.

From a practical point of view, deviations need to be managed. First, small events may lead up to events having a severe impact. There is thus reason to believe that deviations with seemingly less impact should not be treated lightly, and they should be managed accordingly. Secondly, most management of deviations seems to be done informally. An increased usage of various reports, tools and methods does not *per se* improve the handling of the deviations; it may rather hamper the required flexibility by creating unnecessary bureaucracy. Instead, as this paper proposes, projects need to be given freedom at the time when the deviation occurs, and an organizational structure to be able to respond to the events need to be set up. In this case a dual structure involving the line/service organization, project team and the site team seemed helpful. Thirdly, structured collective reflection does not seem to be efficient when facing the acute pressure of time. Rather the team fell back upon a more *ad hoc* reflection based on the present situation. This suggests that organizations should focus their attention on the development of the project teams' network and personal confidence, as informal communication and networks is important for the solving of the studied deviation. Finally, although the study shows a lack of structured collective reflection and use of formal tools and methods it suggests the importance of having both contextually sensitive actions (i.e. improvisation) and control, where the first is set into motion when handling a deviation and the second when the project is running according to plan. This would correspond to the dual nature of project work (Sahlin-Andersson, 2002), which provides a means to develop new ideas, be reactive and to respond to deviations; and at the same time be controllable and efficient. This implies that different activities are managed in different time frames, where structured collective reflection and situational awareness is possible in the aftermath of the

deviation rather than meanwhile. Thus, concluding the paper we suggest that when managing the project there should be an awareness of this dual nature, where activities are managed differently depending on the situation at hand.

References

- Ahrens, T. and Chapman, C.S. (2007), "Management accounting as practice", *Accounting, Organizations and Society*, Vol. 32 Nos 1/2, pp. 1-27.
- Ancona, D. and Bresman, H. (2006), "Begging, borrowing, and building on ideas from the outside to create pulsed innovation inside teams", in Thompson, L. and Choi, H.S. (Eds), *Creativity and Innovation in Organizational Teams*, Lawrence Erlbaum Associates, Mahwah, NJ.
- Ayas, K. (1998), "Learning through projects: meeting the implementation challenge", in Lundin, R.A. and Midler, C. (Eds), *Projects as Arenas for Renewal and Learning Processes*, Kluwer Academic Publisher, Dordrecht, pp. 89-98.
- Blomquist, T., Gällstedt, M., Hällgren, M., Nilsson, A. and Söderholm, A. (2006), *Project as Practice: Making Project Research Matter*, IRNOP VII, Xian.
- Brady, T. and Davies, A. (2004), "Building project capabilities: from exploratory to exploitative learning", *Organization Studies*, Vol. 25 No. 9, pp. 1601-21.
- Brown, J.S. and Duguid, P. (1991), "Organizational learning and communities-of practice: toward a unified view of working, learning and innovation", *Organization Science*, Vol. 2 No. 1, pp. 40-57.
- Cicmil, S. (2005), "Reflection, participation and learning in project environments: a multiple perspective agenda", in Love, P., Fong, P.S.W. and Irani, Z. (Eds), *Management of Knowledge in Project Environments*, Elsevier, Oxford, pp. 156-79.
- Cicmil, S., Williams, T., Thomas, J. and Hodgson, D. (2006), "Rethinking project management: researching the actuality of projects", *International Journal of Project Management*, Vol. 24 No. 8, pp. 675-86.
- Clegg, S., Kornberger, M. and Rhodes, C. (2007), "Business ethics as practice", *British Journal of Management*, Vol. 18 No. 2, pp. 107-22.
- Dvir, D. and Lechler, T. (2004), "Plans are nothing, changing plans is everything: the impact of changes on project success", *Research Policy*, Vol. 33 No. 1, pp. 1-15.
- Eisenhardt, K.M. (1989), "Building theories from case study research", *Academy of Management Review*, Vol. 14 No. 4, pp. 532-50.
- Ekstedt, E., Söderholm, A. and Wirdenius, H. (1999), *Neo-industrial Organizing: Renewal by Action and Knowledge Formation in a Project-intensive Economy*, Routledge, London.
- Engwall, M. (2002), "The futile dream of the perfect goal", in Sahlin-Andersson, K. and Söderholm, A. (Eds), *Beyond Project Management – New Perspectives on the Temporary-Permanent Dilemma*, Liber Ekonomi, Malmö, pp. 241-60.
- Engwall, M. and Svensson, C. (2004), "Cheetah teams in product development: the most extreme form of temporary organization?", *Scandinavian Journal of Management*, Vol. 20 No. 3, pp. 297-317.
- Firestone, J.M. and McElroy, M. (2003), *Key Issues in the New Knowledge Management*, Elsevier Inc., Burlington, MA.
- Gherardi, S. (2000), "Practice-based theorizing on learning and knowing in organizations", *Organization*, Vol. 7 No. 2, pp. 211-23.

-
- Gherardi, S. and Nicolini, D. (2000), "The organizational learning of safety in communities of practice", *Journal of Management Inquiry*, Vol. 9 No. 1, pp. 7-18.
- Hallett, T. and Ventresca, M.J. (2006), "How institutions form: loose coupling as mechanism in Gouldner's patterns of industrial bureaucracy", *American Behavioral Scientist*, Vol. 49 No. 7, pp. 908-24.
- Hällgren, M. (2007), "Beyond the point of no return: on the management of deviations", *International Journal of Project Management*, Vol. 25 No. 8, pp. 773-80.
- Hällgren, M. and Maaninen-Olsson, E. (2005), "Deviations, ambiguity and uncertainty in project intensive organizations", *Project Management Journal*, Vol. 36 No. 3, pp. 17-26.
- Hällgren, M. and Wilson, T. (2007), "Mini muddling: learning from project plan deviations", *Journal of Workplace Learning*, Vol. 19 No. 2, pp. 92-107.
- Hodgson, D. (2004), "Project work: the legacy of bureaucratic control in the post-bureaucratic organisation", *Organization*, Vol. 1 No. 1, pp. 81-100.
- Jarzabkowski, P. (2005), *Strategy as Practice*, Sage, London.
- Jarzabkowski, P., Balogun, J. and Seidl, D. (2007), "Strategizing: the challenges of a practice perspective", *Human Relations*, Vol. 60 No. 1, pp. 5-27.
- Johnson, G., Melin, L. and Whittington, R. (2003), "Micro strategy and strategizing: towards an activity-based view", *Journal of Management Studies*, Vol. 40 No. 1, pp. 3-22.
- Keegan, A. and Turner, J.R. (2002), "The management of innovation in project-based firms", *Long Range Planning*, Vol. 35 No. 4, pp. 367-88.
- Kloppenborg, T. and Opfer, W.A. (2002), "Forty years of project management research: trends, interpretations, and predictions", in Slevin, D., Cleland, D. and Pinto, J. (Eds), *The Frontiers of Project Management Research*, Project Management Institute, Newtown Square, PA, pp. 3-30.
- Kylen, B.J. (1985), "What business leaders do – before they are surprised", in Lamb, R. and Shrivastava, P. (Eds), *Advances in Strategic Management*, JAI Press, Greenwich, CT, pp. 181-222.
- Lee, A.S. and Baskerville, L.R. (2003), "Generalizing generalizability in information systems research", *Information Systems Research*, Vol. 14 No. 3, pp. 221-43.
- Lindhahl, M. (2003), "Produktion till Varje Pris: Om Planering och Improvisation i Anläggningsprojekt" ("Production at any price: about planning and improvisation in construction projects"), dissertation, Royal Institute of Technology, The Department of Industrial Management, Stockholm.
- Lindqvist, L. (2005), "Knowledge communities and knowledge collectivities: a typology of knowledge work in groups", *Journal of Management Studies*, Vol. 42 No. 6, pp. 1189-210.
- Loosemore, M. (1998), "Organisational behaviour during a construction crisis", *International Journal of Project Management*, Vol. 16 No. 2, pp. 115-21.
- Lundin, R.A. and Söderholm, A. (1995), "A theory of the temporary organization", *Scandinavian Journal of Management*, Vol. 11 No. 4, pp. 437-55.
- Maaninen-Olsson, E. (2007), "Projekt i tid och rum – Kunskapsintegrering mellan projektet och dess historiska och organisatoriska kontext" ("Knowledge integration between the project and its historical and organizational context"), doctoral thesis, Uppsala University, Uppsala.
- Maaninen-Olsson, E. and Mähring, M. (2008), "Boundary work across the project life cycle", paper presented at EGOS conference, Amsterdam, July 10-12.

- Merriam, S.B. (1988), *Case Study Research in Education: A Qualitative Approach*, Jossey-Bass, San Francisco, CA.
- Newell, S., Bresnen, M., Edelman, L., Scarbrough, H. and Swan, J. (2006), "Sharing knowledge across projects: limits to ICT-led project review practices", *Management Learning*, Vol. 37 No. 2, pp. 167-85.
- Nicholas, J.M. (2001), *Project Management for Business and Technology*, Prentice-Hall, Upper Saddle River, NJ.
- Orr, J.E. (1996), *Talking About Machines: An Ethnography of a Modern Job*, Cornell University Press, New York, NY.
- Perrow, C. (1999), *Normal Accidents: Living with High Risk Technologies*, Princeton University Press, Princeton, NJ.
- Pettigrew, A.M. (1997), "What is a processual analysis?", *Scandinavian Journal of Management*, Vol. 13 No. 4, pp. 337-48.
- PMI (2004), *A Guide to the Project Management Body of Knowledge*, Project Management Institute, Newtown Square, PA.
- Reckwitz, A. (2002), "Toward a theory of social practices: a development in culturalist theorizing", *European Journal of Social Theory*, Vol. 5 No. 2, pp. 243-63.
- Sahlin-Andersson, K. (2002), "Project management as boundary work", in Sahlin-Andersson, K. and Söderholm, A. (Eds), *Beyond Project Management – New Perspectives on the Temporary-Permanent Dilemma*, Liber Ekonomi, Malmö, pp. 241-60.
- Scarbrough, H., Bresnen, M., Edelman, L., Laurent, S., Newell, S. and Swan, J. (2004), "The processes of project-based learning – an exploratory study", *Management Learning*, Vol. 25 No. 4, pp. 491-505.
- Schatzki, T.R., Knorr-Cetina, K. and Von Savigny, E. (2001), *The Practice Turn in Contemporary Theory*, Routledge, New York, NY.
- Seo, M.G. and Creed, W.E.D. (2002), "Institutional contradictions, praxis, and institutional change: a dialectical perspective", *The Academy of Management Review*, Vol. 27 No. 2, pp. 222-47.
- Söderholm, A. (2008), "Project management of unexpected events", *International Journal of Project Management*, Vol. 26 No. 1, pp. 80-6.
- Spear, S. and Bowen, H.K. (1999), "Decoding the DNA of the Toyota production system", *Harvard Business Review*, Vol. 1999 No. 5, pp. 96-106.
- Standish Group (1995), "Chaos report", Standish group, Boston, MA, available at: www.standishgroup.com (accessed October 10, 2005).
- Weick, K.E. (1979), *The Social Psychology of Organizing*, McGraw-Hill, New York, NY.
- Weick, K.E. and Suthcliffe, K.M. (2001), *Managing the Unexpected*, Jossey-Bass, San Francisco, CA.
- Wenger, E.C. (1998), *Communities of Practice: Learning, Meaning and Identity*, Cambridge University Press, Cambridge.
- Wiig, K. (2004), *People-focused Knowledge Management: How Effective Decision Making Leads to Corporate Success*, Elsevier Inc., Burlington, MA.
- Whittington, R. (1996), "Strategy as practice", *Long Range Planning*, Vol. 29 No. 5, pp. 731-5.
- Whittington, R. (2006), "Completing the practice turn in strategy research", *Organization Studies*, Vol. 27 No. 5, pp. 613-34.
- Yin, R.K. (2003), *Case Study Research: Design and Methods*, 3rd ed., Sage, Thousand Oaks, CA.

Zollo, M. and Winter, S.G. (2002), "Deliberate learning and the evolution of dynamic capabilities", *Organization Science*, Vol. 13 No. 3, pp. 339-51.

Further reading

Hällgren, M. and Wilson, T. (2008), "Projects-as-practice: a new approach", *Project and Profits*, Vol. 8 No. 2, pp. 35-42.

Corresponding author

Markus Hällgren can be contacted at: markus.hallgren@usbe.umu.se