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Project management of unexpected events

Anders Söderholm *

Umeå School of Business, Umeå University, SE-901 87 Umeå, Sweden

Abstract

Unexpected events and environmental impact not planned for are common during project implementation. This article explores how unexpected events are dealt with in projects using qualitative case study data from four different cases. Results show four different approaches to deal with unexpected events: innovative action, applying detachment strategies, setting up intensive meeting schedules and negotiating project conditions are common approaches to deal with the unexpected events. The discussion shed new light on one common situations during project execution – i.e. dealing with unexpected events – that is not normally included in the best practice models of project management.
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1. Introduction

Project management practices are often, in the text book version and from the project manager's viewpoint, conceived of as "executing the plan" as efficient as possible while avoiding difficulties and deviations. As a consequence, dealing with the project environment is also a part of the execution assignment and included in the plan. First, environment is taken care of at scheduled points in time, for example, at initiation, stage-gate review occasions and at termination. Such events are part of the project model used and points in time where the project is open for external impact. Second, risk management procedures are in place to mitigate consequences of, among other things, outside disturbances that may have a negative impact on the project.

Environmental issues are thus turned into planned events or are being subject for risk assessment. The unpredictability and randomness of project environments are kept aside and project management are mostly concerned with internal issues. Consequently, project management models cannot be accused of being "black box" models. On the contrary, project management models fully illuminate the project itself while leaving the environment somewhat hidden in darkness [1].

However, investigating the relations between project execution and the project environment is being an increasingly more interesting issue for at least three reasons. First, many projects are organized in networks having several partners [2,3] thus being dependent on several host organizations and somewhat different goals. Second, organizations are more frequently referred to as being project-based or project dependent [4–7] with projects as a vital part of the organizational architecture. These two observations (project networks and organizations being project based) also indicate that projects are frequently and regularly organized by a large number of organizations. Environment is also becoming a more emphasized topic when moving from major one-off projects to frequent and regular project operations. It is also recognized in traditional PM literature that environmental relations need management attention but as the relation become more complex it is also becoming less possible to foresee and less possible to plan. This is also made a topic of research to a greater extent today than what used to be the case [8–13] as well as suggested, in the literature reviews, as a desired topic to investigate more thoroughly [14].

* Tel.: +46 70 654 90 46.
E-mail address: Anders.Soderholm@usbe.umu.se

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This paper aims at contributing to the stream of the literature inquiring into the links between a project and its environment. More precisely, we aim at an outline of different categories of unexpected events appearing in projects as a consequence of environmental impact and how these are dealt with.

1.1. Between plans and unexpected events

Traditional and normative project management models, such as the various bodies of knowledge presently on the market, are highly rational and sequential in the approach to project management issues, built on the idea of major independent projects being the role model, heavily dependent on structure, administrative systems and the execution of plans. Several text books also discusses project management along similar lines (there are many, see e.g. [15,16]). It is a theory for the "best of worlds" with order and control as key words [17].

Such models are first of all prescriptions guiding ambitions and rational aspirations in the field rather than they are valid descriptions on project management in practice. The issue on the relation between espoused theories (what is supposed to be done) of projects and the actual project practice, or theory-in-use [18] has been the topic of some recent research efforts [19,20,10]. Research on the practice of projects follows similar lines as a more major shift in social science research, popularly referred to as the *practice turn* [21]. The idea is to "bring work back", using the words of Barley and Kunda [22], in order to make research more relevant and based on what is really going on in organizations. Several research agendas have been formulated following basically similar arguments, such as the communities of practice approach [23], learning and knowledge [24], strategy as practice [25,26] and the so called ANT approach.

Approaching projects from a practice perspective indicates the necessity to highlight actual activities, processes and actions of those that execute projects. Thus, models of project management become secondary and are not made a starting point for research. However, project management bodies of knowledge may well be something used by practitioners to legitimate their actions or as guides for action – but it is not a starting point for building the ontology of the research. Actually, to detach research on projects from ontological constraints provided by best practice project management models is rewarding as it opens up for a more comprehensive and elaborate understanding of the organizational and behavioural aspects of projects. This is true also for organizational studies in general, see for example [27].

The issue on project – environment relations is one of the aspects of project management practices that have been shielded behind rational models and planning approaches, thus not giving the complexity of project – environment practices the attention it deserves. As indicated in the introduction, project environments are depicted in terms of stakeholder relations, risk assessment, program and portfolio contingencies, and stage-gate decision points but less interest is given the everyday struggle to keep projects on track and on schedule, and not much is conveyed in terms of how the unexpected [28,29] is dealt with.

Engwall [8] provides an important contribution, highlighting how parallel activities in the organizational context, experiences and pre-project processes, institutional forces and future aspirations come together in creating the project context. He is able to extend the view of projects by adding time (before and after) and space (organizational context) to the understanding of a focal project. The analysis shows that time frames as well as contextual frames are important for the understanding of project execution and success or failure.

When projects are put into context, as in Engwall's article, it is obvious that it is not possible to assess all possible environmental impacts that may occur over the project life cycle. Still plans have to be made. Plans codify those expectations that are desirable, necessary and likely if actions are carried out in a correct way without any unexpected disturbances. Project plans are repositories of expectations on which managers build their daily activities and hence there is a logical chain where our expectations about the future guide our actions today. Expectations also help direct our attention and guide us in determining what to look for to confirm that our expectations were correct or incorrect. A complication is that people normally tend to seek positive confirmation and may neglect disconfirming information [30]. Unexpected events may thus not be detected early on. March [31] concludes that ambiguity is not only connected to the future. Also the past may be ambiguous with several possible interpretations and possible consequences. Learning is as complicated as planning.

Planning/expecting, executing/acting, learning and experiencing are tightly connected in the mindset of project members and managers. A project is to some extent truly ambiguous and filled with unexpected events created as things do not unfold as planned or because conditions change over time. Projects are still being successfully carried out and we praise the amazing project managers that seem to be able to cope with changes all the time. They seem to exercise the art of "managing the unexpected" parallel to executing the plan.

Based on the research agendas presented by Engwall and Weick and Sutcliffe, we aim at an investigation of how unexpected events are managed and we are looking more carefully on such events where the link between the project and the environment is established and attended to by managers.

1.2. Research approach and case overview

The research is built on case studies. Cases were chosen to depict different organizational and industrial contexts but with the common focus on projects as a main organizational form for developing and delivering products and ser-

vices. Cases are thus similar in terms of the project focus, but different in terms of industry and products, to enable cross case comparisons and the discovery of project common features across organizations (see for example [32]). The case selection criteria were primarily project types, and secondly organizational types. It is not feasible to present cases at length in a journal manuscript. We are thus following the format suggested by Eisenhardt and Graebner [33]. Consequently, our cases are briefly presented below and also referred to in the results section. Empirical evidence and conceptual discussions are intertwined to build emergent categories on the research topic.

Data was collected through interviews and documents. The organizations were visited several times to follow up on project progress and 10–20 interviews were conducted in each organization. Main issues discussed during interviews were project progress and experiences at each point in time. Issues on environmental impact was thus not the only issue on which data was collected but as environmental aspects came up in the discussion, further questions were asked and the issue explored more in depth. Cases included are the following:

Delivery of harbour equipment – The company develops, manufacture, deliver and install harbour systems for loading and unloading of ships. Their specific competence is related to particular cargo types where their products are especially well suited. The project under study was one of the largest won by the company and involved the combined efforts of the company and a number of sub-contractors for on-site installations, transportation and subsystem manufacturing. Parallel activities at the factory and the customer's site made coordination and communication between two teams a crucial issue. While the factory based team concentrated on engineering work, logistics, manufacturing and procurement, the site team was primarily focused on advanced construction and testing. The factory team had its peak in terms of activities performed prior to the peak at the site. Critical project phases included the final design of the system and procurement, shipping of goods, final testing and hand-over. Several changes occurred during the project. The customer changed system specifications at several occasions, causing loops in the design process. Design innovations in other parallel projects were included in the focal project as well. Delays during construction had an impact on the time frame available for testing. The system was successfully delivered on time.

Delivery of power plants – The company develops, manufacture, deliver and install major power plants for, normally, public customers. Their specific competence is related to the power transmission technology. The project studies was a major investment for the customer even though technology used and system design were well known. Critical project phases are similar to the previous case presented; including bidding, system design, shipping, construction and hand-over. The industry is competitive with heavy penalties for project delays. Logistics and profitable procurement is thus a crucial factor for project success. Delays in deliveries from sub-contractors and unexpected problems at site created several unexpected path of events that needed to be attended to by managers. However, the completed plant was delivered successfully on time.

Development of medical equipment for blood tests and analysis – The company develops and sells instruments to analyze blood samples at hospitals or independent laboratories. The particular project under study was the development of a new product with considerable higher capacity than those previously offered by the company. The new product targeted the needs of particular markets. Technology utilized and working procedures were initially the same as for previous product development projects but it turned out that progress was slow and the project failed to meet the estimated delivery dates due to unexpected problems during the development process. These problems had to do with technological components and system sub-contractors failing to meet the requirements. A major review of the project resulted in a re-start with a new product specification and a re-organized project where technological expertise was complemented with system engineering competence. The product reached the market delayed and with a lower capacity than originally planned for.

Organizational change in a public health care organization – The organization runs several hospitals and family care units and implemented major changes in the organizational structure as well as in routines and procedures as a consequence of poor financial results and a need for down sizing. It included a completely new budget and accounting system, new effectiveness and efficiency measurements and changes in the organizational structure of units, annual planning cycle and intra-organizational relations. The overall governance system with political representatives was changed parallel to the focal project. The project team was headed by the CEO and the top management team who had several groups working on specific issues but none was full time employed within the project. Several unexpected events occurred during the implementation phase that went on for almost three years. The scope of the project was re-defined a couple of times due to public debate, political interference and upcoming elections. Delayed deliveries of IT support meant that the implementation had to be re-scheduled. Differences among the hospitals impacted the implementation speed and it was necessary to have different implementation schedules for different units of the organizations. The project reached the financial goals and the new financial system was in operation at the end of the project period while other issues were abandoned after a new organizational change had been agreed upon.

2. Results

Projects run through different stages on their way to completion. Time is not always the most important defin-

ing factor (in some cases financial resources, or functional requirements override the time schedule) but time is still an important factor used to distinguish between different project practices. We will concentrate on the execution or implementation stage when project progress is actually being achieved.

During implementation, projects are supposed be as closed as possible and concentrated on execution according to plans. This does include scheduled environment interactions such as scheduled review meetings and stage-gate decision points. In addition, our cases show that there are frequent interactions with the environment with an impact on project conditions or goals. ''Revisions'', ''re-openings'' and ''daily fine tuning'' will be discussed as three major practices during implementation that are part of the project manager's work.

2.1. Three categories of events: re-openings, revisions and fine tuning

The first category, re-openings, has to do with the stakeholder relation. Obviously projects are heavily dependent on stakeholders; first in order to be conceptualized and started; further on to be implemented and terminated. However, stakeholders are not necessarily expressing one single desire or a set of demands that are unambiguous. More often demands are either abstract or contradictory especially when looked upon over time. This is to say that stakeholder interests, preferences and mutual relations change over time.

Changing of stakeholder interests can be due to a number of reasons; from minor changes of priorities to turnaround requirements in the business environment. In a case when single projects are headed by more than one organizational body, stakeholders relations to each other can change over time; maybe from harmonious to conflict or vice versa. It is also possible that some stakeholders quit and others enter.

The implication is that changes of stakeholders' interests sometimes result in re-openings of projects. Re-opening means that the project is opened up for new definitions in terms of for example task, time or cost-limits. For long-term projects dealing with innovative matters, re-opening is a measurement to adapt to changing environment. Experiences gained at the time of the re-opening are summarized and new plans are made for the next section of the work. Some project managers might interpret re-opening as the end of a project and the start of a new one, especially, of course, if there is a change of project manager. But, by discussing it as re-opening it is clarified that it is basically the same project even though some major parts of it might have been changed during the re-opening. The same overall goal for the future project delivery may remain while major changes can be done in terms of either functions, cost or time.

Some contexts are likely to favour re-opening more than other. Most obviously, re-openings are more likely if a project is run by stake-holders with multiple interests and with different ways of measuring project outcome (for example different definitions of ''profit''). The case with a major re-organization of a public organization was characterized by frequent re-openings as new issues were added to or taken off the change agenda, when political considerations changed or when some unintended consequences were detected and made public.

Another reason for re-openings is when projects are constantly failing to deliver positive progress reports. One of our cases, the medical test device development project, was not making progress as planned and as a consequence the project was halted and opened. The review that followed resulted in a fundamental change of the project specifications. Once this was done, the project was allowed to continue but with a new time plan, a new product specification and a renewed set of team members.

The second category is revisions. One of the most emphasized ideas in project management is that projects need to be planned. Plans are furthermore supposed to be prepared initially during the project's earliest phase as a mean to ensure fulfilment of project goals within specified time and cost limits. Revisions and changes of initial plans are however very common and most managers would argue that they are inevitable for any project that is extended over some time. First, revisions are more likely if plans are made for a longer time than they are if plans only cover a short time. This is obvious as the more distant future is less easy to foresee. Second, revisions are more likely if a project is dependent on other projects or companies and results of their work. Likewise, this is obvious as many such dependencies opens up for an increased number of revisions in single projects. Third, revisions are more likely if the task at hand in one way or another means that innovation or creative work is needed. If a project are set up to find out things that are not already known (for example, new products, new technology, etcetera) it is obvious that the effort will be difficult to plan and forecast, at least in detail.

Three reasons that, each one, increase the probability of revisions have been briefly described above. Hypothetically, a project where no revisions occurred should be a project with extremely short time horizon, with no dependencies to other projects or companies and with only a repetitive, well known, task to attend. Not many projects like that exist and, thus, revisions are a part of every-day life of project managers.

Dealing with revisions is a main issue in the cases under study. This is the one single issue requiring most innovative and on the spot actions by the project managers. Common is that they are empowered to make decisions necessary to keep the project on track, even though these decision may require complete re-shuffling of resources within the project. Most companies have procedures on how to deal with customer related changes, or procedures on the routine to apply if a major problem occurs that may jeopardize the success of the project. Project managers hold the responsi-

bility to attend to the changes as they become inevitable and to foresee potential threats that may develop into change requirements.

All projects had gone through revisions and changes. A common practice applied at those occasions is to try to detach the revision requirement from the project itself to facilitate the management of the change. In one case, a major breakdown of the equipment shortly before delivery caused the project manager to decide to put the engineers on a freight liner to re-assemble the equipment during transport to the customer. Similar events took place in all engineering projects. At some occasions, the project manager had to negotiate with stakeholders, customers or project superiors on how to deal with the changes. Common, however, was that the project manager had to go beyond plans and utilize resources in new ways to keep on track.

The third category is daily fine-tuning. It is often assumed that project, project members and the task attended to is an isolated "unit" with limited environment contacts. Prescriptions on commitment-building, team motivation, etcetera, are often built upon the notion that the project need to be isolated from the surrounding organization or environment in general. One of the project managers' responsibilities is thus to protect the project from environmental disturbances and project members from outside distraction or, if necessary, to govern type, frequency, and content of environment contacts.

This is an effort that is bound to fail. No matter how successful a project manager is in protecting the project there are always inside to outside mutual contacts. First of all, team members are passing in and out from the project; physically as well as mentally. Some of the team members are engaged in other parallel projects or in the daily work of their functional department. Even though all members were only hired to work with one project there would still be a number of ways for experiences, knowledge, etcetera, from the outside to get in and likewise ways for experience, etcetera from the inside to get out. It will, so to speak, always be channels for exchange of experiences and knowledge not only within a project but also among projects or from project to surrounding organization.

Consequently there is a daily fine tuning of project work and outside commitments. The modern multi-project organization with a high number of parallel mid-size or small projects will always have fine tuning going on. This was reported in all our cases. The re-organization project had no full time project team members and project members were thus continuously influenced by their regular job and changed their priorities and expectations accordingly. Many of those working on R&D in the medical test device project and the commercial vehicle project had parallel assignments in their functional departments and parallel priorities that influenced the progress of the project.

Fine tuning indicates a constant flow of information, experiences and people in to and out from the project. Projects are transparent and constantly "leaking". This appeared to be an issue for all project managers under study. They reported on people having parallel agendas, on having people coming and going, and having to share crucial resources with other projects or functional departments, having to wait for things to be done in other projects or at other sites before being able to continue the work in the focal project etc. Dealing with the consequences of fine tuning was, along with revision, one of the most prevalent activities of the project manager in terms of environment – project relations.

3. Discussion

First, it is in place to remind the reader that the article outlining patterns in the management of unexpected or unforeseen events that has to do with environment relations. Scheduled interactions, risk assessment, stage-gates and review meetings are in addition to the issues brought up in the previous section. The various issues discussed in this paper thus constitute elements in a model of the unexpected character of environment – project relations and the practice attached to the relation. It is first and foremost a descriptive model based on case studies of several projects.

The most general observation is that projects have to be considered as being contextually dependent and continuously contingent on environmental relations. Reasons for the various categories of events (re-openings, revisions, fine-tuning) vary from case to case. Stakeholder interest and changing business considerations are important to explain issues that impact the project during execution. Lack of desired progress and changes priorities are additional explanations. Another important factor reported upon is the transparent feature of projects that is difficult to escape, at least in smaller or mid-sized projects.

However, the main issue to be discussed is the management practices associated with the events discussed. What can be concluded is that project managers engage in a number of practices in order to stay on track while constantly being exposed to unexpected events. The main practices having been observed are as follows:

- Innovative action – to creatively design action patterns to deal with un-anticipated changes including re-shuffling of resources, delaying some parts of the project while helping other parts, making use of slack resources in the project or company, outsourcing. Innovative action is problem solving on-site and short term. Experiences of the manager and level of empowerment is reported as being important in terms of defining innovative action. It requires the managers to go outside the plan and, in some cases, outside the normal procedures applied in the company. Innovative action is applied frequently in all cases as a way of dealing with re-openings, revisions and fine-tuning. Some project managers reported the ability to design and implement innovative action to be the most important feature of a successful project manager. One claimed that innovative action begins the minute after the plan has been approved.

- Extensive meeting schedules and short term coordination – to closely monitor a problematic sequence of the project and to assure continuous information flow and commitment-building between team members working on the problem. Extensive meetings include frequent (in some cases daily) decisions on resources or assignments among team members. The meetings are often said to induce a sense of task force and urgency to the group and keep up the commitment among team members. Extensive meetings can follow on re-opening or as a way of dealing with major revisions.
- Detachment strategies – to isolate the consequences of revisions as much as possible in order to minimize consequences for other parts of the project, for example design changes to allow others to continue working despite lacking some modules of the product or the creation of new sub-projects to deal with specified revisions.
- Negotiation skills and project safe guarding – to negotiate with functional departments, steering committees, customers or other stakeholders to have more resources assigned to the project or to change some of the deliverables (time, functionality, etc.), and to ensure project status and resources.

The findings reported have a number of implications for research as well as practice. First, in terms of research, we are re-iterating the necessity to look beyond best practice models when designing and conducting empirical research. The most challenging observations may be effectively shielded by a too narrow looking ontology. Second, the paper shows the necessity of contextualize research on projects to also include time as well as space dimensions beyond the single project borders and time frames. Third, the patterns highlighted in this paper could be addressed in a more precise way by close-up studies on the action patterns, sequences of actions undertaken and micro-level mechanisms at work. That would be an interesting agenda adding to a project-as-practice perspective.

For project management practice, it may be valuable to consider the corporate and project capabilities held by the company in terms of dealing with the environment – project links. Instead of denying such links, they may be deliberately addressed in a more profound and efficient way on the corporate level as well as on the project level. In addition, the practices applied to deal with the unexpected could be trained and supported in various ways. Innovative action can be more or less efficient depending on experiences available and the courage of managers. Meeting schedules can be developed and supported by the organization in terms of supporting tools and procedures. Detachment strategies can be more or less easy to apply depending on e.g. product architecture. A number of entry points for such discussions on how to develop practice are found in this paper.

4. Conclusions

Organizations are more and more "projectified" and find themselves dependent on a large number of small and mid-sized projects, and a few larger ones. A new corporate landscape and a renewed set of management challenges arise in such organizational settings requiring new approaches to understand operations as well as management ([4,7], see also [34]). The focus on projects, project environments, and projects as corporate components are all part of this renewed management agenda. The contribution of this paper – an outline of patterns of environment – project links – is one approach and one contribution to the overall development of more refined understanding of contemporary organizations.

The paper has showed how the environment keys in with project work during execution, through re-openings, revisions, and fine-tuning. Taken together the analysis deepens the understanding of project management challenges and provides some conceptual understanding to the everlasting issue on how to relate the separate task of the project to the developments of the organizational context and the time frame of which the projects are one part.

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