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Project models and the practice of project management in different types of projects

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Abstract

Project management models and methodologies have been developed, to improve the efficiency and quality of project execution. The practice of project management may deviate from the models because of various unplanned circumstances that call for improvisation. This research aims to identify ways to enhance and develop the project models toward flexible implementation. A qualitative two-case study is reported, and three types of deviations from an existing project model are mapped. The results contribute by increased understanding on the rationale for deviating from the existing project models, and by revealing internally and externally driven individual and group-level approaches to improvisation.

Keywords: project model, projects as practice, improvisation, deviation

Introduction

Successful management of projects requires using good practices and learning through experience. Companies may use standard project models (APM 2012, Garel 2013, PMI 2013) or tailor a specific project model for their unique needs in project management. However, the practice of project management does not necessarily follow the established model (e.g. Blomquist et al. 2010; Cicmil et al. 2006). Project managers and personnel may improvise to anticipate or respond to unforeseen events in the project situation or context (Chelariu et al. 2002, Leybourne 2006), or act without thinking about processes, tools or theories (Klein et al. 2015); the projects may deviate from the plans, calling for unplanned actions (Hällgren & Maaninen-Olsson 2005); and changes may be made, to solve problems and respond to stakeholders' needs (Dvir & Lechler 2004, Steffens et al. 2007). The need to deviate from plans and models is very seldom discussed or taught by the standards and textbooks (Leybourne 2006).

Various unexpected events take place in any projects due to stakeholders' actions and project personnel's interest to influence the stakeholders (Aaltonen et al. 2010). Demanding project schedules and scope changes may drive improvisation in projects (Leybourne 2006, 2009) and different environments will give rise to different forms of improvisation (Chelariu et al. 2002, Jerbrant & Karrbom Gustavsson 2013). The interplay between project models and improvisation is still poorly understood.

The purpose of this study is to explore alternative types of variation in the practice of project management, as compared to an official project model. The goal is to

complement previous ideas of improvisation with a more fine-tuned mapping of variation types that challenge established project models. Thereby, the research aims to identify ways to enhance and develop the project models toward flexible implementation. The research question is: *How and why do project practices deviate from the project model, and how do personnel improvise in different project settings.* The research task will be covered particularly from the viewpoint of engineering and organization change projects that have been conducted using the organization's official project model but deviating from it in various ways.

Literature review

Project management associations have formulated standard project models and methodologies that represent the good practices and required knowledge foundations in managing projects successfully (APM 2012, Garel 2013, PMI 2013). Companies are very active in using such models and methodologies, but in fact a major part of the used models or methodologies are either created or tailored specifically for the companies' own needs (White & Fortune 2002). Also it has been noticed that project management methodologies can be helpful in promoting the projects' performance (Lehtonen & Martinsuo 2006). A key challenge with project management models and methodologies is, however, the high variety of different types of projects, each calling for a different ways of managing (Morris et al. 2006).

Critical and practice-centric project management research has challenged the assumptions of project management models because they do not explain the day-to-day practice in projects, and the creativity and imagination required from project professionals clearly exceed the offered guidelines (Morris et al. 2006). Even if the project-specific requirements were included in each specific project plan, it has been noticed that deviations to plans are quite ordinary (Hällgren & Maaninen-Olsson 2005), and, thereby, changes are made and change management becomes an inherent part of the practice of project management (Dvir & Lechler 2004, Steffens et al. 2007).

During the past few decades, increasing attention has been directed at the practice of project management that purposefully deviates from the official project management models and methodologies, i.e. improvisation. Improvisation is characterized with the lack of or deviation from plans, continuous use of information and evaluation of activity, and learning (Chelariu et al. 2002). It requires intuition - i.e. rapid, holistic judgments without apparent rational thought (e.g. Leyborne & Sadler-Smith 2006) - as well as creativity and adaptation (Leyborne 2009). Particularly as projects can be seen as complex social systems, the practice of project management needs to account for the situational factors, which implies improvisation (Klein et al. 2015). Table 1 summarizes examples of previous research covering improvisation in project management.

As the table 1 shows, some research has already examined factors driving improvisation, the relevant dimensions in improvisation, and the performance consequences. Literature reviews dominate, implying the need for empirical illustrations of the theoretical frameworks. Empirical research has been either qualitative and limited in its contextual setting (Jerbrant & Karrbom Gustavsson 2013, Leyborne 2006) or cross-sectoral (Leyborne & Sadler-Smith 2006), suggesting that empirical studies exploring improvisation in different types of contexts or project types are still needed.

Table 1. Summary of previous research on improvisation in project management.

	Research design and data (context)	Key finding	Gaps/opportunities for this study
Chelariu et al. 2002	Literature review	Propositions on information flows, context, improvisation practice and organizational memory and outcomes; and ideas on improvisation typology	Need for empirical research.
Jerbrant & Karrbom Gustavsson 2013	Two company cases, observation and interview data (engineering and telecom)	Structures and situated actions in project portfolios, both at the level of the portfolio and concerning projects. Methodologies do not provide enough support for sense-making and, therefore, situated actions (i.e. improvisation) are needed.	Need to understand different types of organizations, and different ways to improvise.
Klein et al. 2015	Literature review	Different types of improvisation, complexity promoting the need for improvisation, conceptual model of resilient project management based on the four degrees of improvisation.	Need for empirical research in different contexts.
Leybourne 2006	Case study with six organizations, multiple methods (financial services sector)	Extensive use and acceptance of improvisation among the organizations, emerging from the circumstances and context. Acceptance, application, control and effectiveness of improvisation differed across organizations.	Focus on financial sector and strategic change - also other industries and project types should be studied.
Leybourne 2009	Literature review	Comparison of improvisation and agile project management on key constructs: creativity, intuition, bricolage, adaption, compression, innovation, and learning.	Need for empirical research in different contexts.
Leyborne & Sadler-Smith 2006	Cross-sectional survey among UK APM members.	Identified a positive relationship between the use of intuitive judgements and improvisation; between experience and improvisation; between the use of intuitive judgements and experience; and between the use of intuitive judgements and externally focused project outcomes.	Need for research on the relationships between project type, contextual factors, and improvisation outcomes.

Research design

We employed a qualitative research design and conducted a case study to respond to the research question. A multiple-case design was used and attention was directed at multiple subunits (Yin 2009). The case study was about the project business of different organizations, and the subunits were different project activities delivered or implemented by the organizations. The unit of analysis was the project business of the organizations; the subunits acted as examples guiding the interview discussions.

In order to increase the generalizability of the results, we sought for different organizations with experience in project-based organizing. Through two ongoing research projects, we gained access to two different organizations: one engineering

company and one public-sector organization (a municipality). The projects in the companies differ both in terms of complexity and management practices. The research setting is illustrated in Table 2.

Table 2. Background information of the case organizations and interviews.

	EngineeringCo	CityOrg
Organization	An engineering company delivering standard and tailored machinery solutions for its customers	A large municipality organization
Example project activities covered	3 delivery projects with different levels of project and product complexity	1 change program aiming at changing digitalizing the work design of the municipality, including ~10 projects
Data collection	<ul style="list-style-type: none"> - 8 semi-structured interviews with project team members - 3 interviews with the project manager - 1 results workshop with research participants - Documentation: project plans of the three case projects 	<ul style="list-style-type: none"> - 8 semi-structured interviews with program and project personnel - 1 workshop with program and project personnel - 1 results workshop with research participants - Documentation: program and project-level plans

The primary data consist of semi-structured interviews with the key personnel, such as project and program managers and project team members. The interviews focused on both the existing project model, and the processes and practices actually used in the different projects. The interview data was supplemented with secondary data, such as project documentation.

In CityOrg, the interviews were tape recorded and the recordings were transcribed by an external service provider. Regarding EngineeringCo, the interviewees preferred the interviews not to be recorded, so detailed notes were written by a researcher.

The data were content analyzed. The analysis followed an inductive coding approach. The analysis focused on identifying such events where project work had differed (i.e., deviation, improvisation etc.) from the typical ways of the organization (either an official project model or an established routine), and on understanding the characteristics of and reasons behind those events.

The results and the researchers' interpretations were validated by multiple interviews and data collection methods (data triangulation) and by organizing separate results workshops with the case organizations. The case organizations and quotations are anonymized to ensure the anonymity of the research participants. The quotations have also been translated to English.

Findings

In both of the case organizations, the utilized project management model was a combination of an organization-level official model and the practices of project and program managers. Regarding CityOrg, there was an established model for (single) project management, and a similar model for (multi-project) program management was being designed during the research. The program manager of CityOrg had experience in project management, so the program management model was a combination of CityOrg's official project management regulation and the experiences and preferences of the program manager. Regarding EngineeringCo, the project manager combined elements of the official company-level project management model and his own experiences and preferences.

The interviewees' experiences of using the project model and deviating from it revealed three different types of deviations, based on a framework developed using both earlier literature and the inductive analysis. During the analysis, we sought for factors relevant in the need for improvisation and deviation from the official project management model in different projects, to build up a framework on the reasons for deviations and project managers' and personnel's improvising actions. The main findings are summarized in Table 3.

Table 3. Summary of the empirical findings.

	EngineeringCo	CityOrg
Deviation type 1: Elements of project management models considered useless or too laborious	<ul style="list-style-type: none"> - A steering group was described in the project plan, but no steering group existed <i>in practice</i> - Elements of project plans just copied and pasted 	<ul style="list-style-type: none"> - A steering group was set up, but no steering happened <i>in practice</i> - Project plans were written, but then forgotten and ignored
Deviation type 2: Shortcomings or incompatibilities in the project management models	<ul style="list-style-type: none"> - The reliance on output control and self-control did not suit projects with increased levels of uncertainty - Demanding project schedules forced the company to adapt 	<ul style="list-style-type: none"> - The project management model did not acknowledge the overlap between two subprojects - The reliance on self-control and subproject autonomy suited subprojects differently
Deviation type 3: change-related deviations	<ul style="list-style-type: none"> - The project customer can have unclear requirements in the early phases of a project, or the requirements can change during project implementation 	<ul style="list-style-type: none"> - The scope of one subproject was unclear and changed significantly, which caused problems for the subproject team

Deviation type 1: elements of project management models considered useless or too laborious

The first type of deviation revealed in the data occurred in situations where the interviewees were struggling to understand the necessity of some elements of the project management models. This led to these elements either being excluded and ignored, or being included only seemingly.

One example relates to the work of the steering group in CityOrg. Based on the official documents only, the organizational structure of the project activities in CityOrg is relatively "textbook-like". Particularly, they nominate a steering group that includes a wide range of representatives from different functions of the organization and whose task is to steer and monitor the progress of different project activities in CityOrg. In reality, though, this steering was considered as ostensible by interviewees representing both the case program and the steering group. A representative of the steering group explained: "*How could we have steered the program, when the information we got was so bad? All you could say based on that information was 'ok'...*"

Another example relates to project planning. In EngineeringCo, project plans follow a formal structure with pre-defined sections. The interviewed project manager perceives the majority of the sections as relatively important and sensible. However, there are also sections that are perceived as unnecessary and, consequently, become almost ignored. These include, for instance, risk analysis and steering groups. Risk lists are often just copied and pasted from existing project plans to the new ones. Composition of a steering group is defined in the plan, but no steering group typically exists in real life: "*Oh, it looks like we had even a steering group [explaining to the researcher]. No, we*

didn't have. I went to discuss with my manager [mentioned in the slide] if needed, but there was no steering group."

The last example relates to subproject planning in CityOrg. The program management model of CityOrg requires a project plan to be written for each subproject. Because of this requirement, project plans are written but, in reality, they are often more or less forgotten after their approval in the early phases of the program. As a subproject manager described: *"Haha [laughing]. This version is almost identical to the one I drafted in the beginning of the program [related to the final version of the subproject plan]."*

Deviation type 2: shortcomings or incompatibilities in the project management models

The second type of deviation was experienced concerning events where the interviewees perceived that the project management model either was incompatible with or did not consider some emerging situations. The project teams then had to cope with these situations without the support of the project management model.

An example relates to the division of work between the subprojects of CityOrg. During program implementation, it turned out that two of the subprojects were doing relatively similar tasks. This overlap had not been recognized in the planning phase, but the subprojects (subproject managers) then began working closely together on their own initiative: *"That co-operation was not planned at all. We just noticed that our subprojects were working towards similar issues, so we then began to work closely together."*

Another example in CityOrg deals particularly with the control and management style of the program manager. The program manager knew many of the subproject managers and team members beforehand and trusted them. Consequently, subproject managers' self-control and autonomy had a central role in the control approach of the program manager. It was problematic that the program manager controlled the whole program relatively similarly. The chosen approach suited those subproject managers who had a good understanding about the goals and work methods of their tasks. However, there was also a subproject that had a less clearly defined scope: *"The subproject never had a steering group. Basically the subproject reported just to the program manager who then reported to the program's steering group. There was no control or support, the subproject was left completely alone."* This describes how there was an incompatibility between the managerial approach of the program manager and the control and support requirements of the subproject manager. Consequently, the subproject manager reacted by seeking additional support, which was problematic for the whole program: *"Then, without the support, the subproject manager started to seek for support in the program status meetings. And then that one subproject started to use all the available time in the program status meetings."*

The role of project start meetings was discussed in EngineeringCo. The project start meeting has a central role in the way the project manager of EngineeringCo manages projects. Particularly, the project start meeting acts as a situation where the project team agrees on the work division and schedule of an upcoming project. The project manager rests his managerial approach heavily on trust and the project managers' self-control. Slightly exaggerated, no additional control is required after the project start meeting, but the project team just fulfills the defined tasks. However, if the scope and the details of the projects are not clear enough in the start meeting and if some uncertainties occur, this kind of a control approach does not work. Then the project manager and the project team have to act differently and tailor the management approach for the situation.

Also another example relates to EngineeringCo. According to the interviewees, rush and demanding project schedules often force EngineeringCo to react, tailor and even

improvise the project management approach. In practice this means, for instance, increased concurrent engineering and more efficient utilization of subcontractors: *“We constantly seek for ways to speed up the project. We, for instance, sent incomplete specifications to subcontractors and asked them to start with the complete elements, while we finish the incomplete ones.”*

Deviation type 3: change-related deviations

Some deviations occurred in events where some changes occurred during project implementation. These changes then forced the project teams to react and adjust accordingly.

For example, CityOrg experienced some uncertainties in scope definition. The program included one subproject with a scope that was not completely clear for the program manager, the subproject manager, or the parent organization itself in the beginning of the program. In addition, the scope of the subproject changed, which forced the subproject team to change their work approach and caused also several difficulties: *“Originally the subproject was expected to revolutionize the document management of the city by introducing one software solution -- then it turned out, that the top management was not interested in the new software tools, but instead the new ways of working.”*

Regarding EngineeringCo, changes took place particularly in relation to project customers. There are two main types of changes: the customer does not know all the requirements for the machine when the delivery project starts, or the customer changes the requirements during project implementation. Both types require flexibility and adaption from EngineeringCo. The late identification of requirements can, for instance, lead to the need of concurrent engineering discussed earlier. Changes in requirements, in turn, may transform to new work, as an interviewee illustrated: *“We had a work-in-progress machine in the factory and the customer came to look at the machine. After the visit the customer wanted some changes to the machine, which of course required extra work from us.”*

Discussion

The three types of deviations identified in the data offer evidence for the first part of the research question *“How and why do project practices deviate from the project model?”* The results show that the project management model cannot cover all types of projects, all types of situations in projects, and all changes in projects and, therefore, project personnel need to be creative in the practices that they use. With their practices, project personnel adapt to the unique properties of each project, respond to emerging situations, and deal with unforeseen changes.

Table 1 illustrated earlier evidence and the low amount of empirical research covering improvisation in different project contexts. The second part of the research question asked: *How do personnel improvise in different project settings?* This study contributes by identifying four different types of project improvisation, based on the evidence in the two different project contexts. Figure 1 summarizes the three-dimensional project improvisation framework developed in this study.

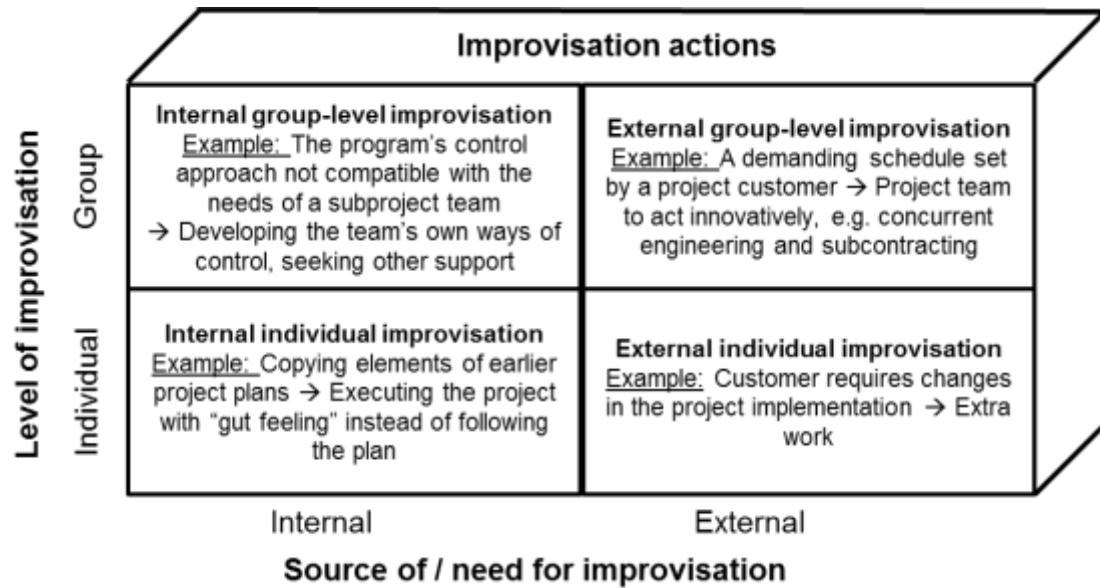


Figure 1. Framework of project improvisation.

The framework developed in this study characterizes project improvisation in three dimensions: the conducted improvisation actions, the source of / need for improvisation and the level at which improvisation takes place. The framework demonstrates (horizontal axis) how the need for improvisation can stem from either an internal source (e.g. the parent organization or the project itself) or an external source (e.g. the project customer). This division helps in allocating attention both to intra-organizational and inter-organizational factors that require deviation from the project management model and, thereby, complements existing empirical studies on project improvisation (e.g. Jerbrant & Karrbom Gustavsson 2013, Leybourne 2006).

The vertical axis of the framework illustrates the level at which improvisation takes place. Following the definition of Cunha et al. (1999), *organizational* improvisation is practiced “by an organization and/or its members”. Similarly, organizational improvisation has been divided into collective and individual improvisation (Moorman & Miner 1998). Existing literature on *project* improvisation, however, often emphasizes the role of the project managers (e.g. Klein et al. 2015). The results of this study demonstrate how, in addition to the project manager, there are other improvising actors, and that they can be individuals or groups of individuals. Project managers are often considered as the improvising actors in the existing literature, but their activities can also create the need for improvisation for other project actors.

In addition to the developed framework, this study contributes to the literature on project improvisation in some other ways. This study answers to the call for empirical research on project improvisation in different contexts (e.g. Klein et al. 2015) by showing results from engineering and organization change projects. Project improvisation has been argued to be particularly typical in the late phases of a project (Leybourne 2006). As a contrast, the results of this study demonstrate different types of project improvisation throughout the project’s lifecycle. Furthermore, this study has analyzed project improvisation particularly as different deviations from a project management model. This study adopted a broad conceptualization of a project management model, including standard and standard-like models (e.g. APM 2012, PMI 2013), structured organization-specific ways of project management, project manager’s personal preferences and established management routines, or a combination of the aforementioned. The project management model of EngineeringCo, for example, was a

combination of the company's official project management regulation and project manager's personal preferences.

Contribution

This paper contributes to the growing discussion on project management methodologies (White & Fortune 2002), projects-as-practice (Blomquist et al. 2010) and critical project management (Cicmil et al. 2006). Regarding improvisation literature, this study supplements the relatively scarce amount of studies conducted in project environments and answers to the call for more empirical studies on project improvisation (e.g. Klein et al. 2015). Particularly, this paper is among the first to study variation in using project models and improvisation in the context of different projects.

The study is limited by the qualitative case-based research design, including only two case organizations. We sought for different case contexts in terms of different organizations and project types, and further cases are needed, to verify the findings. Also, the number of interviewees was limited. We chose key informants who know about the project models and practices and, thereby, sought to increase the validity of the results. Another limitation stems from the interview outlines: we did not formally include any questions about deviations from the project model or improvisation, and these topics emerged as part of the data. The results might be different, had we included such issues into the official interview outline.

The findings generated new ideas for further research. Additional empirical research on project improvisation in different project contexts is needed to test the validity and generalizability of the results of this study and to complement the few earlier empirical studies. Regarding the framework of this study, particularly the dimension of improvisation activities needs more systematic research. This study touches on the concept of project management model as (a combination of) a company regulation and an individual's (i.e. project manager's) personal management routines. The applicability and consequences of this conceptualization in different contexts call for additional empirical research.

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