

On the Role of Project Management Skills in Managing Innovation Processes – Sensing the Nature of Different Tasks and Taking the Right Action

Abstract: In this Column, we focus on the importance of project management skills when managing innovation processes. We report on research that suggests applying a management approach that is sensitive towards specific project situations. We argue that there is no one-size-fits-all approach, and we show that contemporary project management approaches fall short in meeting the creative nature of innovation projects. We present a taxonomy that enables managers to analyze the nature of different tasks to be conducted in a project, and to choose a good mix of management techniques accordingly.

Introduction

A company's ability to innovate is key to its success, and innovation capabilities have been identified as essential for the BPM body of knowledge (vom Brocke et al. 2015). Innovation can be defined as "the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organisation or external relations" (OECD and Eurostat, 2005). To meet the increasing pace of innovation, more and more companies directly engage with other companies as well as academic, private, and governmental research facilities (referred to as collaborative or co-innovation) (Nobelius, 2004). Commonly they develop new products, services, and business models. Each of these innovation activities follows an underlying process that defines how to best innovate in a certain context. Currently, there exists no commonly accepted and widely used co-innovation process, but common features include:

- Turning ideas into innovations: The main goal of the innovation process is to select the "one-big-thing" from the many ideas that are floating around and to turn this into a market ready product, service, or business model.
- Different systematic steps: The innovation process encompasses several systematic steps, from the initial exploring of ideas and prototyping to the implementation and market introduction of the result.
- Pushing ideas along an "innovation funnel": In the quest for innovation it is obvious that from the many ideas that are initially proposed, only a very few turn into new products and services. So people often visualise the innovation process as a funnel, starting with many ideas that being examined, then shaped into concepts and models, and then tested until a final result is selected and launched.

- Variable stage-gates: Multiple “gates” represent decision points, where ideas are being examined and, depending on the outcome, pushed in different ways along the innovation funnel or are stopped completely.
- Various models on involving externals: A wide range of collaborative innovation can be found. They range from single academia-industry collaborations to strategic alliances and joint ventures (Hagedoorn et al., 2000, Inganäs et al., 2009). Well known paradigms include the ideas of “open innovation” (Chesbrough, 2006) and “public-funded research projects” which are based on triple-helix models for multi-stakeholder research (Etzkowitz, 2003).

Project management (PM) is a common practice to carefully plan and manage any type of activity which complies with the basic definition of a project (temporary, unique, and leading to a concrete result (Project Management Institute, 2008)). From a PM perspective each activity that follows an innovation process can be viewed as an individual innovation project. Herby projects can start and stop at different points along the process and include various steps and iterations. In collaborative innovation projects the application of common PM practices is often perceived as difficult as generally they are characterised

- as highly uncertain and ambiguous (and therefore hard to plan and predict),
- as difficult to measure project performance (and therefore difficult to monitor and control),
- as at the same time chaotic and striving for implementation and completion (and therefore requiring a fine balance between creative freedom and control), and
- as dealing with many external partners (and therefore showing a complicated stakeholder management).

To account for these specific management conditions we developed a new concept in PM which takes a situation-specific approach rather than a project-specific approach. This will be introduced in the next section. We first establish the need for this approach, we then provide the theory behind it, and finally we show its application in practice.

Heterogeneous and contradicting management needs

Historically project management has developed from a “one size fits all” approach to the use of project specific methods and tools. The project management community has recognized that an explicitly tailored management style provides a crucial factor for project success and that the adaptation to certain project characteristics is a central task at the start of each project (Dvir et al., 2003, Shenhar, 2001b, Payne and Turner, 1999). Therefore many project type specific PM practices have been developed for certain types, such as software development and construction (e.g. the extensions to the PMBOK Project Management Institute, 2013). This is a step in the right direction, however we argue that this development is not sufficient in the light of innovation projects.

As shown above, collaborative innovation projects are characterized by a highly heterogeneous management environment. For example, they have to be managed without defeating creativity and researchers’ motivations by facilitating spontaneity and supporting the desire for change and rule-breaking (flexibility). At the same

time, however, research has also shown that these projects benefit from firmness in project execution (Tatikonda and Rosenthal, 2000), suggesting that formality and flexibility are distinct constructs and should be simultaneously applied for optimal project performance (Brattström et al., 2012). Ideally, project managers should understand which tasks are creative or less creative and the characteristics of such tasks and adapt their project management style accordingly (vom Brocke and Lippe, 2013). But not only in terms of creativity show these projects need for “contradicting” management styles, many more examples can be provided. In summary, innovation projects show many contradicting management needs at different levels of granularity, technical and political complexity, and concerning various types of stakeholders. This heterogeneity of management conditions calls for different managerial styles also during the project life-cycle. Project managers must be supported in using PM knowledge in a way that they can react to changing managerial conditions, circumstances, and the project’s needs at any time within the life-cycle. Ideally, the project manager can analyze the altering management needs and finds the best PM approach that meets them.

Consequently we propose a situation-specific approach which we develop following the idea of PM contingency theory.

Situation-specific approach in theory

PM contingency theory conceptualizes the interplay between the project needs and the best suited management method (Howell et al., 2010, Shenhar, 2001a, van Donk and Molloy, 2008). In this context, we first assume that a project situation refers to the conditions and circumstances under which management involvement becomes necessary and that they have certain managerial needs. Second, we introduce the notion of situation profiles to relate situational needs and suitable PM approaches. Finally, this tailored approach to different project situations is expected to improve the effectiveness of the applied PM method. The following figure depicts the resulting theoretical framework.

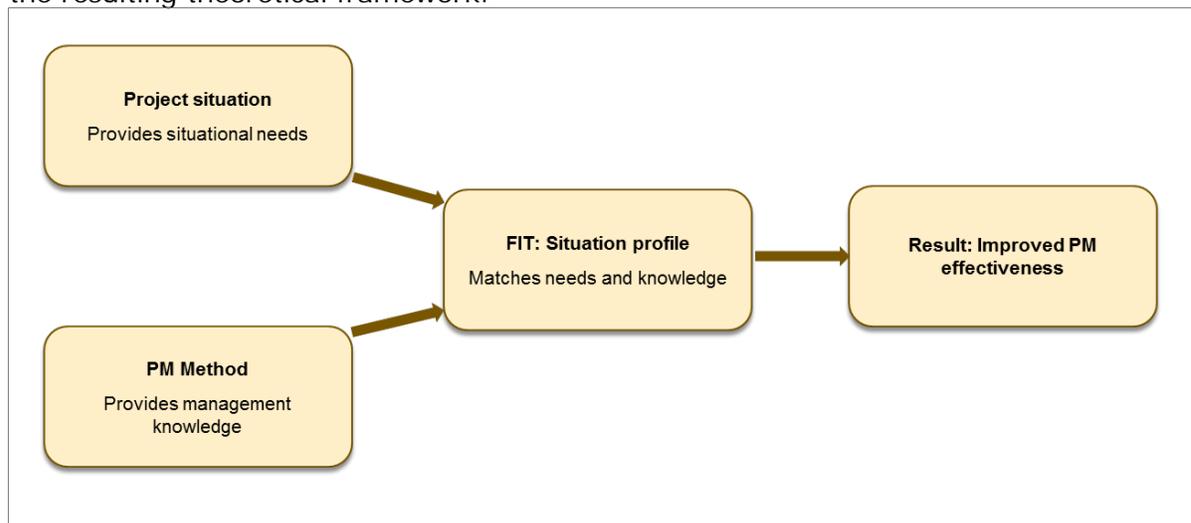


Figure 1 Theoretical framework for situational project management approach

Situation-specific approach in practice

Characterizing the Case: To show the practical applicability of this approach we will focus on a specific type of innovation projects, namely collaborative research

projects funded by the European Commission (EC) in the area of Information Systems (IS). Such projects can be defined as “focused research projects with clearly defined scientific and technological objectives and specific expected results” (EuropeanCommission 2007, p.20). They are executed and co-financed by a consortium of public, academic and private partners (Adler et al. 2009; König et al. 2012). These partners share a common research interest and work across disciplinary, organizational and national boundaries to fulfil project goals (Dewulf et al. 2007; Inganäs et al. 2009). EC-funded research project can be found towards the beginning of the innovation funnel where different ideas are being explored, but no market ready results are generated. Funding opportunities are constantly increasing and so is the number of projects to be managed. For example, the 7th Framework Programme of the European Commission offers a budget of 50.5 billion euros purely in Information and Communication Technology (ICT), which is used to support 1952 projects (EuropeanCommission, 2007).With the new funding scheme Horizon 2020 this investment will be further increased by 46% (EuropeanCommission, 2013).

Development of a framework to describe and analyze project situations: The above described theoretical approach is only usable if different project situations can be described and analyzed for their needs. To support project managers in this step, we developed a framework based on the following assumptions:

- Constituent factors and dimensions: The assumption that situations can be formalized by means of constituent factors and dimensions. Factors are suitable to conceptualize the core characteristics of each situation and allow for a structured analysis of the specific conditions, circumstances and management needs. Dimensions as a suitable concept to express contradicting conditions and as a means to distinguish various situations. Consequently, for each factor a set of related dimensions is required. Within our research we were able to define a set of sixteen factors and dimensions that are relevant for our project type (Lippe et al., 2013, vom Brocke and Lippe, 2011).
- Management indicators: Management allow for a higher-level assessment of the situation. They combine various factors into a category and support a structured analysis of contradicting management needs and the identification of problem areas requiring special PM attention in each situation. Four indicators were salient to our data:
 - o Management target: An assessment of the situation’s management needs should clearly identify the target of the management attention. The target can be technical content, legal aspects of the project, finance and effort, and/or people.
 - o Management demands: Situations strongly differ with respect to the management complexity and the demands imposed on the project manager. Our analysis showed that situations described as less demanding were not very critical or political and/or involved only partners that were engaged and motivated to contribute.
 - o Level of consensus-building: Collaborative research is characterized by a high amount of required consensus-building to conduct the technical work, but also for project administration, legal aspects of the project, and project governance frameworks. When dealing with a situation, the project manager must be aware of the level of consensus-building that is required and possible problems with respect to the ambiguity of

the work plan, the stakeholders' level of interaction, and their interests and agendas.

- o Predictability and structure of work: This indicator expresses the above described contradicting needs creativity versus control. It therefore combines factors that express the contradictory needs for spontaneity and structure, and desires for change and stability in collaborative research work.
- Graphical representation: A suitable concept to describe project situations should entail a graphical representation to be directly usable by project managers. We have chosen a morphological framework to ground the factors, dimensions and indicators.

The resulting graphical framework is shown in figure 2.

Management target			
people	finances and effort	legal aspects	content
Management demands	low	medium	high
cause of situation	management of project work	change/exception handling	conflict resolution
politics	not political	somewhat political	very political
criticality	not critical	somewhat critical	very critical
level of cooperation efforts	engaged	indifferent	reluctant
management position	strong	medium	weak
level of consensus building	low	medium	high
success criteria	definable and consensus	definable and no consensus	fuzzy
ambiguity of work plan	low	medium	high
task dependencies	independent tasks	sequential	interrelated and integrated
agenda of stakeholders	in-line	unclear	strong divergences
Structure and predictability of work	high	medium	low
clarity of results	clear and explicitly defined	predictable but implicitly defined	unclear and elaborating
clarity of working steps	clear and explicitly defined	predictable but implicitly defined	unclear and elaborating
tangibility of working steps	hands-on	communication-intensive	creative
time-pressure	strict timelines	implicit timelines	not time-sensitive
occurrence	short-timelines but reoccurring	short timelines and once	long running
governance	strict processes	guidelines and legal frameworks	no explicit governance

Figure 2 Practical framework to analyse project situations (this one is an example and applicable in the context of collaborative research projects funded by the European Union)

Definition of situation profile: A concrete project situation can now be described by selecting 1-n dimensions for each factor. An analysis is possible as the highlighted dimensions directly show critical needs and conditions in the project with respect to the higher-level indicators. The dimensions are suitable concepts with which to express contradictory conditions and to distinguish situations.

We will now give an example from our data, namely the management of deliverables. It is a central task of the technical project manager to coordinate the writing of collaborative deliverables, including planning contributions, sense-making of contributions, conducting internal project review processes, and submitting final deliverables to the funding body (not included in this profile is the research and production of the content within the deliverables). Coordination of deliverables occurs repeatedly throughout the project, and the interviewees reported that project

managers spend 20–30 percent of their time on this task. This task is demanding as it is a contractual requirement to provide the deliverables on-time to the funding body. In addition, this is one way of communicating the research results to interested stakeholders. Consensus building among partners is low, as usually at the stage of compiling research results all open questions should be solved and most partners have dedicated responsibilities. From a structural perspective this work can be very well defined. Therefore, a suitable management style follows a plan-driven approach. The full profile of this situation is depicted in the following figure:

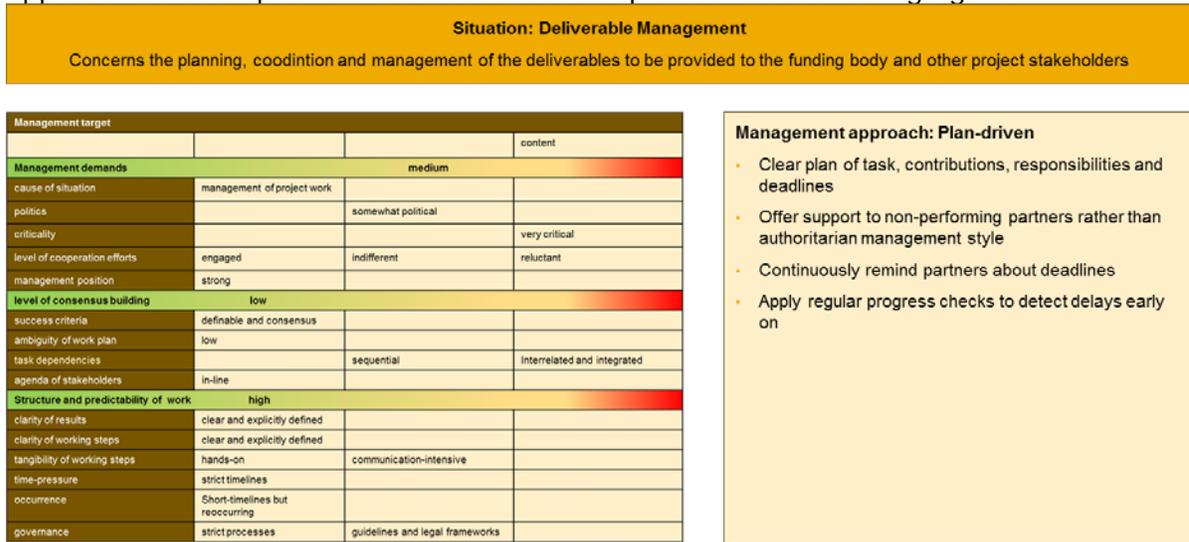


Figure 3 Example situation profile

Application scenarios: We will now describe how this approach can be used in practice. Concretely we identify 3 application scenarios. Defection of common project situation profiles: Not each combination of occurrences within the framework reflects a realistic scenario and can be mapped to a management approach. Also, some combinations are likely to happen more often than others. Thus, a logical step is the identification of a set of major situation profiles including corresponding management approaches which regularly re-occur in a certain project type. This can be done through an evaluation of existing projects as well as through interviews with PM experts. The results can feed into a library or set of best practices which is commonly available and maintained through academic contribution, the PM community, or even single project managers.

1. Management of a specific framework: Within the life-cycle of a concrete project, the framework as well as the future library of profiles significantly improve the effectiveness of a project manager when it comes to a flexible application of management styles. Every time a specific management situation is encountered, there are two options: (1) there is an existing profile including a recommended management approach in the library which fits the circumstances. This can then directly be used without the additional effort of deciding and implementing an appropriate management style and the risk of eventually making wrong choices. (2) there is no fitting profile in the library which fits the circumstances. In this case, the project manager can assess the situation by using the proposed framework and then manually select a management style.
2. Development of an organization wide profile library: If an organization is recurrently involved in the management of innovation projects, it can be beneficial to develop a company internal library of PM contingency profiles

which takes into account company specific requirements. These can be frequently updated by each project manager as part of the closing activities.

Benefits for project managers

The development of a situation specific approach to manage collaborative innovation processes was driven by a practical problem observed among project managers: they lack support in managing their projects and fail at applying existing PM suitably. From our research, such project managers can derive the following guidelines for their daily work:

Understand the paradoxical nature of the project type and remain flexible with respect to the applied PM approach: The project manager should understand that internal and external management conditions might change rapidly and that he/she will experience many different, possibly contradicting management situations along the project life-cycle. It is of utmost importance to detect and analyze the conditions correctly and to remain flexible with respect to the applied PM methods, tools, and techniques. In particular project managers that are new to the field can benefit from this recommendation as current PM literature still mainly suggests to remain with a certain management method once the project has started.

- Analyze each situation with respect to the special needs and challenges: Before deciding on a suitable PM method, the specific situational needs should be understood in detail. The project manager can apply our framework to analyze each situation in the example project type in a structured and unequivocal way. By choosing corresponding dimensions and aggregating them into the higher-level indicators he/she can directly detect critical needs and challenges and direct the management attention accordingly. This reduces uncertainty with regards to the suitability of the applied management method. We recommend the development of further frameworks for other project types.
- Choose from existing situation profiles when possible: To enable re-use within re-occurring situations and to reduce the learning-by-doing effort, we suggest the use of common situation profiles.

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