In search of project leadership principles for navigating the complexity of IT projects

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Abstract

Project complexity is becoming increasingly challenging for project managers. Much research has been done on the concept of project complexity. The majority has focused on identifying the dimensions and drivers of the complexity; not enough research has been concentrated on finding guiding principles to support the practitioners of project management in their struggles to lead complex projects. This paper presents a design of an artifact with this purpose. The artifact is currently in a process of formative evaluation in an interactive DSR process. The preliminary evaluation indicates a high degree of relevance for practitioners in terms of sense-making, but there is a need for more development on the utilization part of the artifact.

Keywords

Project complexity, Cynefin, Stacey matrix, Leadership principles, Complex projects, Simplicity window.

Introduction

Project complexity is becoming more challenging for practitioners of project management. Mostly, project complexity is due to the stakeholders involved; handling this calls for project leadership (Ginger Levin and PgMP 2014). The majority of the scientific knowledge base in this field is descriptive knowledge. There are not enough prescriptive knowledge-based studies helping the practitioners to navigate the complexity of their projects. There is a gap between what science knows and what business needs, and herein lies important research opportunities.

Project complexity is now the second most challenging aspect of project management. A recent survey, as yet unpublished, conducted among practitioners of project management in Denmark revealed one large change compared to the same survey conducted four years ago: ‘Dealing with project complexity’ has moved from the eighth to the second most challenging aspect of project management. Out of the 1064 respondents in the survey, 42% reported working with IT projects. To put the challenge of complexity in context, the first position in both surveys was ‘Securing enough resources for the projects’. In third position was ‘Coordination and securing commitment on all level of organizations’, and in fourth, ‘Leading changes during the project lifecycle’. The order of challenges for IT project managers was the same as for the overall picture.

Stakeholders are the main cause of complexity in projects. The report Navigating Complexity documented that by far the most characteristic aspect of complex projects is having ‘Multiple stakeholders’, followed closely by ‘Ambiguity of project features, resources, phases, etc.’ (Cooke-Davies 2013).

Project managers report being challenged by project complexity, and leadership qualities are needed to handle the stakeholders, who are the main cause of the complexity (Ginger Levin and PgMP 2014). The research on project complexity has not yet come to project managers’ rescue in this matter. One prominent paper on project complexity concluded “It is vital that this research begins its own paradigm shift and builds on a common language that moves the debate from defining complexity and its characteristics to...”
developing responses to project complexities. Maybe then, we can help practitioners and their organizations to manage complexity, instead of creating an even more complex (and complicated) reality” (Geraldi et al. 2011). Searching through the papers since 2011 has not revealed much progress on that account. Much more research is needed.

This paper takes on one a small part of the big gap between what science knows and what practitioners need, by asking the following research question: What principles make sense for a project management practitioner to use when leading complex IT projects?

The remainder of this paper is structured as follows: Firstly, in the next sector, the research methodology is explained. Following this, there is a short literature review with highlights from the scientific field of project complexity. Hereafter, the preliminary results of the emergent research are presented. Finally, the conclusion is presented, along with consideration of the further research.

**Research methodology**

Finding principles that could guide practitioners may call for Action Research (AR), which comes in many forms (Bradbury-Huang 2010). However, using the action research approach for this research question might be putting too much faith in serendipity, with a high risk of concluding the project with no clear contribution made. Another option would be to use Design Science Research (DSR), where the research is kept in a fine balance between the environment, with its business needs and research opportunities, on the one hand, and on the other hand, the knowledge base, with a focus on the rigor of the contributions (Hevner 2007). Further, it has been argued that AR is similar to DSR (Järvinen 2007). Therefore, a compound of the two is doable.

The current knowledge base regarding project complexity is very much descriptive, and the prescriptive knowledge needed for the design of artifacts with a high degree of relevance might not be present. The choice of methodology for an investigation the selected research question should be in the middle ground between Action Research and Design Science Research. A method called Soft Design Research (Baskerville et al. 2009) has been under consideration. The selected method for this work is closest to a lean version of DSR (Ruhi and Akhigbe 2016). No matter what version of DSR is used, though, a thorough evaluation is of the utmost importance as part of the process, and the evaluations framework FEDS (Venable et al. 2016) is applied for this purpose in this research.

**Defining project complexity**

There are many papers on project complexity, and very little agreement among them. However, there is general agreement that there is no commonly accepted definition of project complexity. This is stated in one form and another in around half of the papers published in the field of project complexity. However, there is not much work being done on what such a definition might be. The focus is mostly on evaluation, and on discussing what dimensions are right to describe project complexity. One often-used definition is: Project complexity is the property of a project which makes it difficult to understand, foresee and keep under control its overall behavior, even when given reasonably complete information about the project system. Its drivers are factors related to project size, project variety, project interdependence (Vidal et al. 2011). Another example of a definition, one that focuses on projects being complex adaptive systems (not just systems), is selected here: Complex projects, like complex adaptive systems, are characterized by high levels of Uncertainty, Ambiguity, Decreasing levels of trust (Remington 2016).

The old definition of project complexity, from Baccarini, as “consisting of many varied interrelated parts” (Baccarini 1996), is today considered to be one of the dimensions (called structural complexity), among many other dimensions in the concept of project complexity. In the years following this initial definition, the discussion led to new dimensions being added, as this quote exemplifies: Project complexity can be characterized by two dimensions, each of which has two sub-dimensions: Structural uncertainty (number of elements and interdependence of elements) and Uncertainty (uncertainty in goals and uncertainty in methods) (Williams 1999).

A systematic review was conducted in 2011. Here, the conclusion was that project complexity has evolved to encompass five dimensions: Structural complexity, Uncertainty, Dynamic, Pace, and Socio-political (Geraldi et al. 2011). A similar review performed five years later showed further development, and
The work mentioned here is only the tip of the iceberg in terms of the range of research papers on project complexity. From these, the following dimensions can also be suggested, in a non-exhaustive list: stakeholder management, social, trust, product/service, quality, client, finance, legal, social, cultural, cognitive, operative, external and business environment. Concluding the literature review, there is a large diversity of hierarchies of dimensions, each with the aim of clarifying the concept of project complexity. No prevailing model of the concept was found.

Complex versus complicated is an important notion which is winning traction in terms of the division of project complexity into complex and complicated. One conceptualization of this can be found in the Cynefin Framework (Kurtz and Snowden 2003), and later, in a more referenced version (Snowden and Boone 2007). The complex domain in the Cynefin Framework is where emergence as a non-deterministic aspect of projects occurs. Emergence as a concept in projects is elaborated upon in many papers, one being (Daniel and Daniel 2018). Another aspect of the Cynefin Framework is the divisions in order and un-order. The ordered side is often dominated by system thinking and the un-ordered side with complexity theory. With inspiration from biology, we can make the following distinction: Systems theory and system thinking are concerned with “defining the ideal future state of the system and trying to close the gap between the current trajectory and this desired future” (Jucevičius and Grumadaite 2014). The project objective is very much akin to the “future state” and the project plan and its execution are like “closing the gap”, in this instance. In contrast to the way of thinking apparent in systems theory, we have the complexity approach, where it is important to realize that the latter “has no ambition of predicting the future or defining the “ideal” state of the system; it is more about describing the present and seeing what can be changed” (Jucevičius and Grumadaite 2014). In other words, complex systems are more about the present, and what we can change – rather than what we want to change. Systems theory begins with what we want to change. These are two very fundamentally different outlooks for approaching the processes in projects.

Design of the artifact

So far in the project, a preliminary design has been completed, which contained the first version of an artifact addressing the issues of leading complex projects for project managers. There have been several workshops where participants have interacted with the artifact and, afterwards, evaluated it. In the following, the preliminary design is presented.

The design has been produced by the author with inspiration from the Cynefin Framework (Kurtz, 2003) and Stacey’s matrix (Dodevska and Mihic 2014). The latter is a design from Zimmerman (Zimmerman, 1998), who attributed the model to Ralf Stacey, hence the name. The later version of the Cynefin Framework outlines the five domains, called obvious, complicated, complex,Chaotic and dis-order (Snowden and Boone 2007). The fifth domain is for when you don’t know which of the other four domains the situation belongs to.

The design artifact is a merger of the two models combined with elements of a variety of papers on project complexity. Of these, some are mentioned under the previous section, ‘Defining project complexity’; the rest are listed here in alphabetic order: (Bakhshi et al. 2016), (Chapman 2016), (Cooke-Davies et al. 2007), (Daniel and Daniel 2018), (Dao et al. 2016), (Hass 2008), (Mikkelsen 2016), (Popescu 2016), and (Xia and Lee 2004).

The design is shown in figure 1 and consists of a 2by2 matrix based on the complicated/complex dichotomy, where the former only applies when there is consensus and clarity on goals and means. There are two types of complexity, either based on unpredictability or on stakeholder disagreements. When the situation is characterized by both disagreement and uncertainty, the project is on the edge of chaos.

The designed artifact is called “The simplicity window”, based on one workshop participant’s evaluation: “Handling the complexity of my project seems to be much simpler when it is observed through this window”.

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expanded the understanding to eight dimensions: Structural complexity, Uncertainty, Emergence, Autonomy, Connectivity, Diversity, Socio-political, and Element of context (Bakhshi et al. 2016).
**Figure 1**: The simplicity window. A categorization artifact, helping project managers to choose a course of action for their project leadership based on the situational characteristics.

**Evaluation in process**

The DSR project uses the Framework for Evaluation of Design Science (FEDS), (Venable et al. 2016). The strategy is naturalistic (instead of artificial), hence the artifact is tested and evaluated by project managers, who apply it to their own projects and issues in workshops.

So far, more than 50 project managers have engaged in the evaluation. The evaluation revealed that the design had good sensemaking effects. The preliminary result can be summed up as: On a scale of 1 to 10, the average score for the question, "Does the model make sense to you?" was 8.5. However, on the question “Do you find it easy to position an actual issue, from a given project, in one quadrant?" the average score was only 6.3.

Based on the preliminary findings, the simplicity window makes a lot of sense to project managers, but there is still some way to go in terms of its utilization as a practical tool for the navigation of project complexity. We are on track on the principles level, but the conversion of principles into practice is still something to work on.

**Conclusion and future research**

Based on the preliminary findings, we are now a bit closer to answering the question: What principles make sense for a project management practitioner to use when leading complex IT projects? The formative evaluation of the preliminary design indicates a high success rate in terms of sense-making among practitioners and project managers using the design in workshops, working with their own projects. However, the evaluation also highlighted the need for more and better guidance of the practitioners in determining the nature of the situation. Future research may include working on an improved understanding of the boundaries in the artifact, helping practitioners to identify the appropriate initiatives together with the extraction of more principles on which to base the leadership of projects and navigating the complexity.
REFERENCES

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