

# Evaluation Criteria for Scalable - Agile IT-Projectmanagement Frameworks

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# 1 Introduction

The need for information-technological solutions in modern service companies is high. Customer wishes are to be satisfied with a high tempo and short innovation intervals. Thus, speed and flexibility in development teams are essential for the success of any company in this sector. Conditionally, agile project management methods as a successful alternative to traditional methods have seen a strong growth in many industries. One characteristic of these methods is, that they are only defined and mature for small teams of up to 10 people. If a larger organization wants to introduce agile methods into their development department the problem of very high communication and coordination need can arise through the structuring of the department in teams of 5 to 10 persons. Complexity as a reason for failure of IT projects has lead companies to look for a clear and unambiguous understanding of IT project complexity (Neumeier and Wolf (2017)), especially for agile projects which have a lot more room for dynamics and feedback cycles. The following thesis explores the scaling of agile methods as they are being done and the principles behind the scaling process.

Based on these restructuring approaches combined with new hierarchies, personal and philosophy for information technology development strategies a scaling problem is found. The problem of scaling agile project management is in essence a problem of complexity. The aspect of scaling is not defined exactly for organizations with (project-)team oriented structures. There are already many practical heuristics and best practices, that are summarized into frameworks. These frameworks expand the fundamental structure of agile methods by several activities, rules and structures. Though, there is still a need for a theoretical foundation and rigorous scientific approach to the problem of complexity at hand. This is supported by the article of (Dikert et al. (2016)), which states that the existing frameworks are not analyzed from rigorous academic standards. This thesis will focus on the effects of scaling on coordination and communication for an organization that uses agile methods.

## 1.1 Research Questions

The leading question in this subtopic is "How can the complexity of scaled-agile organizations be mapped uniformly?"

Following sub-questions have to be answered as well. What are the parameters and rules of complexity for the scaling of agile organizations? What are the effects of scaling an agile organization? The second research question relates to the parameter and rules of scaling. What are the principles that the scaling of agile projects follow? These rules are hard to synthesize in practice. The following work will try to achieve the task at hand in an exploratory style based on three main sources for information. First up, a literature analysis is conducted on complexity in social systems and on the scaling of agile IT-project management. This analysis is important to find connections that are already made between the two field and also apply the acquired knowledge around complexity to the field of scaled IT-project management. Next up, a basic simulation tool is proposed for the simulation of states a system under certain variation of parameters can be in. The tool is used to view the main theme from another perspective and look at the variability in possible states scaling brings with it. Lastly, to view the problem from a practical standpoint and to find possible rules due to emergence that cannot be mapped by a basic interaction model, interviews with key employees at the IT department of a german investment bank about the topic at hand are conducted. In the end these results are used to synthesize a set of principles for the scaling of agile project management methods.

## 1.2 Classification of the Thesis

This thesis can be classed under the topics complex systems in the literature of social systems (Taleb (2018), Mandelbrot and Hudson (2004), Oswald et al. (2018)) and IT-project management frameworks (Leffingwell (2017), Dingsøy et al. (2017), Laanti (2014)). The aspect of complexity arises from the feedback in communication and coordination between the team members and their environment. Individuals interact with other individuals that are part of the organization or not in order to gain information for the completion of the task at hand. A part of this aspect is the different emergent states a system can be in, when scaled up and down. Certain IT-project management frameworks already try to work with these problems in different ways. These areas together form the study of agile frameworks and methods within different organizational scales.

## 1.3 Cooperation

As part of the master's thesis, a cooperation with a german investment bank is taking place. The company is asking the question of when and why a scalable agile framework is required and whether it is necessary for the investment bank. Furthermore, it is to be worked out how many and which kind of hierarchy levels are necessary for providing information in relation to the decision making process. Under these topics it will be explored how a scalable-agile framework supports and enhances decision-making. The collaboration includes providing information on the processes and organization of the IT departments and working together with various IT project team members in a survey of best practices in IT. Information on the structure and process organization can found, firstly, in documents of IT governance and IT security. In addition to these areas, concrete sources include, for example, the cooperation model IT "Current Status of Agile Transition" and the "Area Structure IT and IT Operations". For the synthesis of best practices and the further data collection, the employees and executives of the program "Banking Control IT" are available.

## 10 Conclusion

This thesis was built around the argument that organizations are complex adaptive social systems. It had an exploratory character. First, the literature on Complexity in social system was tied to the literature of IT-project management frameworks to get insight into the existing theories around social systems and the connection to IT-projects. Findings from the literature were several theories on the structure and characteristics of social system. Main themes in the literature on social systems were complex adaptiveness, scaling, emergence and opacity. For the literature on scaled-agile agile project management some of the theories from the literature on social systems are applied but the focus was mostly on the synthesis of nested approaches to existing agile methods from smaller scales and the analysis of potential success factors for scaling agility. After a extensive analysis of existing literature the themes were implemented into a time-discrete, stochastic, agent-based monte carlo simulation to analyze possible fundamental characteristics of social systems. Results regarded the volatility and extreme values of states under certain circumstances in an agent based system in terms of signal values that are send between agents. The results should be viewed critically, as Mandelbrot and Hudson (2004) states, (prediction) models should work in congestion with past data and should work with any future data that is received. If they don't work in such a way, their use is questionable. Parallel, a set of interviews was done at the IT department of a german investment bank, that had just finished implementing SAFe to scale up agile software development. The answers were discussed and compared to existing theories. Lastly, the three inputs were used to derive fundamental principles for the scaling of (agile) projects.

The principles derived in this thesis should give a fundamental understanding on how to approach the scaling of (agile) project management methods. The first research question about the mapping of scaled-agile organizations was answered during the synthesize of the principles. The second research question was answered with the principles as it is a follow-up to the first research question.

Suggestion for further research are the evaluation of models as a prediction tool to social complex systems, since this thesis argues that the possibilities of fitting a complex system into a model is limited because of the properties that define a complex system. See also the argument of the procrustian bed (Taleb (2016)). Moreover, the principles proposed should be checked thoroughly to validate them further since the character of this thesis was mostly exploratory and theoretical. Another avenue for further research is the discussion and validation of existing authors, such as Luhmann (2015), Taleb (2016/2018) or Mandelbrot and Hudson (2004) and others. Furthermore, when applying any scaling technique the designer has to be reminded that most rules of interaction on one level do not scale into the next level. This universal scaling Taleb (2016) can be a trap for the Scrum of Scrums or Pi planning approaches and needs to be viewed with skepticism. This relationship is another perspective for further research in this field. Also, since a literature analysis was conducted, this thesis affirms the finding by Dikert et al. (2016) and calls for more rigorous research approaches to these topics.

The field of agile project management and project management in general remains stochastic and dynamic in nature, as any social system is and should be viewed as such. Static and deterministic approaches cannot derive results applicable to real life situations and should be abandoned. Research results from theoretical models should be viewed very critically to not infer to easily connections to way more complex real life scenarios.