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AGILE CAPABILITY ANALYSIS

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Software is a part of our lives. Embedded into everyday equipment, into living and working environments or modern means of transportation, countless processors and controllers make our lives simpler, safer, and more pleasant. We help organizations develop software systems that are dependable in every aspect, and empirically validate the necessary processes, methods, and techniques, emphasizing engineering-style principles such as measurability and transparency.

The Fraunhofer Institute for Experimental Software Engineering IESE in Kaiserslautern has been one of the world's leading research institutes in the area of software and systems engineering for more than 20 years. Its researchers have contributed their expertise in the areas of Processes, Architecture, Security, Safety, Requirements Engineering, and User Experience in more than 1,200 projects.

Under the leadership of Prof. Peter Liggesmeyer, Fraunhofer IESE is working on innovative topics related to digital ecosystems, such as Industrie 4.0, Big Data, and Cyber-Security. As a technology and innovation partner for the digital transformation in the areas of Autonomous & Cyber-Physical Systems and Digital Services, the institute's research focuses on the interaction between embedded systems and information systems in digital ecosystems.

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AGILE CAPABILITY ANALYSIS

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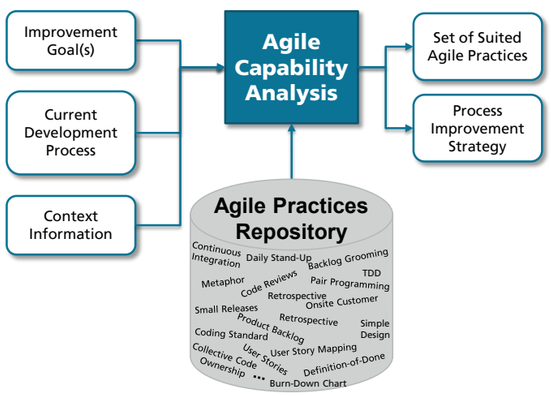
The capability to deliver innovations to the customer quickly is an important factor in the struggle to remain competitive in a hard-fought market. In this context, agile development methods, in particular, have gained much popularity when it comes to rolling out new features as fast as possible while ensuring at the same time that they match the needs of the customer. Using these methods and mastering the underlying practices, however, requires various adjustments, especially in domains with major regulatory requirements (such as ISO26262 or the Medical Devices Act in the case of functional safety).

AGILE VS. REGULATIONS?

Regulations, such as standards, rules, laws, and guidelines, are no contradiction to agile development in general. But they define constraints for methods and practices that need to be adhered to. Thus, regulations have a strong impact on the extent to which agility can be introduced into an organization. This includes, for instance:

- Mandatory development process elements (e.g., roles, activities, or work products)
- Specific engineering methods
- Specific best practices and templates

Often it is not possible or feasible to simply replace the whole development process by an agile method (such as Scum or XP); rather, a more incremental evolutionary approach must be followed. Since an agile method can be decomposed into single practices being followed (such as Sprints, pair programming, or daily standup meetings), it may be perfectly possible to introduce some of these practices into the existing development process and therewith increase the "degree of agility". Yet, what is the right degree in the organizational context to accomplish the improvement goals underlying the introduction of agile development (such as reducing time-to-market, or increasing efficiency or effectiveness)?



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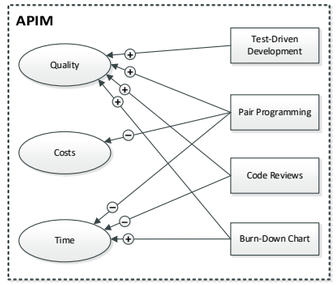

The purpose of the Agile Capability Analysis is to identify the right "degree of agility" by analyzing the capability for incrementally extending the current development process with agile practices while explicitly taking into account the specific organizational context and regulatory requirements. Key characteristics of the approach include:

- Analyzing process improvement potential resulting from the introduction of agile practices
- Dealing with regulative constraints and laws
- Assessing the individual impact of agile practices, e.g., on process and product quality
- Prioritizing and defining an improvement strategy

The approach is based on an Agile Practices Repository containing a comprehensive set of the most popular agile practices grouped according to the affected engineering lifecycle processes from ISO/IEC 12207. Furthermore, an Agile Practices Impact Model is provided for documenting the connection between agile practices and their positive and negative impact on characteristics such as cost, time, and quality.

The basic steps of an Agile Capability Analysis are as follows:

- Align the improvement goals of an organization with potential agile practices based on the impacted characteristics
- Restrict the set of practices based on regulatory requirements and other organizational constraints
- Analyze the required change of the existing development process by hypothetically integrating the selected practices considering the specific context
- Create an improvement strategy for implementing the suited agile practices

RELATED SERVICES

- Identification of critical factors for scaling up agile methods in an organization (such as team coordination, product management) and tailoring of scaling practices (such as Scrum of Scums) or scaling methods (such as SAFe)
- Quantitative definition of expectations regarding the improvement potential (e.g., in terms of time-to-market, performance, or quality) of the current process
- Analysis of the impact and benefits of introducing agile methods and practices based on a comprehensive experience repository
- Definition of an overall improvement strategy (process, people, tools) for tailoring agile methods and practices for the development of systems in regulated environments and for introducing the required changes in the organization
- Support for companies regarding implementation and evaluation of the improvement strategy