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Software and systems engineering — Agile development — Agile adoption considerations

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Foreword

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This document was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 7, *Software and systems engineering*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Agile development is a development approach based on iterative development, frequent inspection and adaptation, and incremental deliveries in which requirements and solutions evolve through collaboration in cross-functional teams and through continuous stakeholder feedback (see ISO/IEC/IEEE 26515:2018).

Many organizations recognize the benefits of moving to an agile approach to systems and software development. However, for some organizations the move can be taken too early; before the organization is ready for it. This document provides insight into appropriate considerations when adopting an agile approach to software and systems development. In this document, the focus of these considerations is the agile readiness factors that can be considered before making such a move. Using this information to increase organizational and team readiness can make the difference between a successful move to agile and a failure that prevents the organization from deriving the benefits of an agile approach for several years. This document is primarily intended to be used by those managers responsible for deciding on whether a move to agile can be made and those managers who are tasked with preparing an organization for making such a move. The agile readiness factors considered in the document can be applied at the organizational level and to projects or teams within organizations.

As a Technical Report, this document contains data of a different kind from that normally published as an International Standard or Technical Specification, such as data on the “state of the art”.

Software and systems engineering — Agile development — Agile adoption considerations

1 Scope

This document provides an overview of agile readiness factors that are likely to determine whether an organization, project, product or team is ready to start the transition to using an agile approach to their system and software development and maintenance activities.

This document provides a general approach that is applicable to all agile methodologies and does not cover specific agile methodologies, such as Scrum, SAFe and eXtreme Programming (XP).

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
agile development
development approach based on *iterative development* (3.10), frequent inspection and adaptation, and incremental deliveries in which requirements and solutions evolve through collaboration in cross-functional teams and through continuous *stakeholder* (3.16) feedback

Note 1 to entry: Any use of the word “agile” in this document refers to methodology.

[SOURCE: ISO/IEC/IEEE 26515:2018, 3.1, modified — The reference to an external annex has been removed.]

3.2
agile maturity
extent to which an organization, department, project or team consistently applies agile values and principles that contribute to the achievement of its business needs

3.3
agile team
small cross-functional group of people who collaborate on the development of a product, within an agile methodology

Note 1 to entry: A common agile team size is 3 to 10 people.

3.4
agile team lead
individual responsible for ensuring an *agile team* (3.3) adheres to the organization’s agile principles, practices, values and processes

Note 1 to entry: The agile team lead is a facilitator rather than a manager.

3.5
agreement
mutual acknowledgement of terms and conditions under which a working relationship is conducted

EXAMPLE Contract, memorandum of agreement.

[SOURCE: ISO/IEC/IEEE 12207:2017, 3.1.5]

3.6
customer
organization or person that receives a product or service

[SOURCE: ISO/IEC/IEEE 12207:2017, 3.1.16, modified — The example and note to entry have been deleted.]

3.7
daily stand-up
short, daily, time-boxed meeting used to discuss progress, plans and any blocking issues with each member of an *agile team* (3.3)

Note 1 to entry: Duration is not expected to exceed 15 min.

3.8
increment
tested, deliverable version of a software product that provides new or modified capabilities

[SOURCE: ISO/IEC/IEEE 24765:2017, 3.1913]

3.9
iteration
short time frame in which a set of *software features* (3.15) is developed, leading to a working product that can be demonstrated to *stakeholders* (3.16)

Note 1 to entry: Different agile methodologies use different terms for an iteration.

Note 2 to entry: Some agile methodologies are not based on iterations.

Note 3 to entry: Typical iteration length is two to four weeks.

[SOURCE: ISO/IEC/IEEE 26515:2018, 3.10, modified — Note 3 to entry has been added.]

3.10
iterative development
repeated use of concurrent planning, developing, and testing activities

[SOURCE: ISO/IEC/IEEE 26515:2018, 3.11]

3.11
persona
model of a user with defined characteristics, based on research

[SOURCE: ISO/IEC/IEEE 26513:2017, 3.29]

3.12
product owner
stakeholder (3.16) responsible for the capabilities, acceptance and use of a product

Note 1 to entry: The product owner shares the product vision, required features and their priorities, and acceptance criteria.

3.13
release
distribution of a product *increment* (3.8) to a *customer* (3.6) or users

3.14
software feature
software characteristic specified or implied by requirements documentation

EXAMPLE Functionality, performance, attributes, design constraints.

[SOURCE: ISO/IEC/IEEE 24765:2017, 3.3814]

3.15
sponsor
person or group who provides resources and support for the project, program, or portfolio and is accountable for enabling success

[SOURCE: ISO/IEC/IEEE 24765:2017, 3.3908]

3.16
stakeholder
individual or organization having a right, share, claim, or interest in a system or in its possession of characteristics that meet their needs and expectations

[SOURCE: ISO/IEC/IEEE 15288:2015, 4.1.44, modified — The example and note to entry have been deleted.]

3.17
taskboard
visual display of tasks to be completed by an *agile team* (3.3) and recent progress made by the team

3.18
user story
simple narrative illustrating a user requirement from the perspective of a *persona* (3.11)

[SOURCE: ISO/IEC/IEEE 26515:2018, 3.16]

4 Agile readiness factors

4.1 Overview

The agile readiness factors presented in this document have been derived for use by an organization that wants to determine their level of readiness to adopt an agile methodology for their system and software development. Use of these factors is not intended to provide a decision on whether to move to agile, rather it is to provide guidance on how to make the journey to agile easier. By considering these factors, an organization can gain an understanding of the main risks associated with transitioning into using an agile approach and the factors they need to consider when preparing to transition towards agile ways of working.

The factors are grouped into six logical areas:

— organizational;

— customer;

— project;

— management;

— people/team;

— tools and practices.

In the following subclauses, each of the logical areas is considered in turn by identifying the individual factors relevant to the area and providing a description of how the factor can be used to assess the agile readiness of an organization or project. A quick reference guide to the factors is provided in Annex A.

If an organization believes that they have most of the factors satisfactorily covered, then the organization can consider themselves ready to move to an agile development approach. If there are several factors where it is clear the organization is lacking, then the organization can first decide to address these factors before they adopt their chosen agile methodology.

For most of the agile readiness factors, it is not a simple case of satisfying them or not. There can be degrees of coverage to consider for a given factor and each organization will need to make a subjective judgement about each factor and how important it is to them. For instance, having employees that are experienced in using agile methodologies is a commonly used agile readiness factor. An organization attempting to transition to agile without any people experienced in agile is far less likely to succeed than one with many people that are experienced in agile. However, when considering this factor, an organization will be faced with making a subjective determination of the level of agile experience within their organization (both current level and the minimum level needed to mitigate the risk to transition). This can be based on how many people have agile experience, in what roles and perhaps the length of that experience, among other subjective considerations.

It is extremely rare for any organization to fully satisfy all of the listed agile readiness factors, and it is not expected that an organization would wait until every factor is fully satisfied before making the move to agile. In practice, satisfying only a few of these factors will benefit the user in most situations. With each factor there is a corresponding risk to making the agile transition and this risk will vary based on the context of the organization. Each organization will balance the risks associated with not fully satisfying a given set of readiness factors against the benefits expected to be achieved by moving to using an agile approach. Organizations can also consider the option of customising the agile practices suggested by the agile readiness factors to better fit their individual situations.

Many of the factors not only apply to determining agile readiness, but they can also be used for determining a measure of agile maturity. An organization can have already adopted an agile approach to their development and can then use the factors to help them decide on areas where they can improve, even several years after having transitioned to using an agile approach. In this case, the organization can use their experience of using an agile approach to help decide which outstanding factors are most likely to provide them with the most benefit at the least cost.

NOTE This introduction has focused on an organization's agile readiness, but most of the same factors also apply when determining the agile readiness of a department, single project or team within an organization. Where a factor is specific to assessing readiness for one or the other, it is highlighted.

4.2 Organizational agile readiness factors

4.2.1 Funding

The transition to using an agile development approach typically requires significant funding, such as for training, tooling, resourcing and to support process transition.

The move to agile is considered as a significant change management activity, and perhaps as a project in itself, and, as with any project, it needs to be resourced. Any associated transition plan will include estimates for necessary funding.

4.2.2 Management support

The transition to using an agile development approach requires management support[6][7].

Management support at all levels needs to be visible to all concerned.

If it is an organizational transition, then the support will start at board and executive management level but will also include all levels of management throughout the organizational structure.

If a project or team is transitioning to agile, then all project stakeholders, including the customer, project manager/product manager, delivery leads and participating users, need to buy into the transition.

4.2.3 Organizational change (organization)

The transition to using an agile development approach is more likely to succeed if the organization has experience of successfully making organization-wide changes in the past.

Example organizational level changes include substantial restructuring (e.g. reorganization of Google from a monolithic organization into Alphabet comprising several parts) and entering a new market area.

The move to agile will be considered as a significant change management activity, and perhaps as a project in itself, and, as with any project, it will be far more likely to succeed if the project is led by change leaders who are committed to the change.

If the organization has unsuccessfully attempted organization-wide change in the past, those relevant factors that are thought to have contributed to the failure will have been addressed in a transparent manner – otherwise they will need to be addressed during this transition to agile.

4.2.4 Change support

The move to agile needs to be visibly supported across the whole organization[6].

Depending on the size of the organization, it is sometimes necessary to appoint a marketing role (a role that can sometimes be the responsibility of a change manager) to spread positive information about the transition. Publicity and public events about the transition, such as a transition news website and "question and answer" meetings can be organized. A change champion (or a team of champions) can be appointed as change leaders or change agents. Lack of open support for the transition to agile by the whole organization is sometimes perceived as opposition, or at least a lack of confidence in the change. Experience and capability in change management practices within the organization will also assist staff during the transition.

4.2.5 Agile experience

4.2.5.1 Agile experience (organization)

The transition to using an agile system or software development approach is more likely to succeed if the organization has experience of successfully using an agile approach in another area of the organization, such as in sales, finance or HR[6].

If the organization has unsuccessfully attempted to transition to agile in another (non-software) part of the organization in the past, those relevant factors that are thought to have contributed to the failure will have been addressed in a transparent manner – otherwise they will need to be addressed during this transition to agile system and software development.

Moving a whole organization to using agile development is often easier if a successful pilot project is run within the organization first. The pilot project needs to be carefully selected. The lessons learned from the pilot can be used in training material, and, very importantly, the participants in the pilot need to be retained and empowered to spread their experience and motivation to other agile projects.

4.2.5.2 Agile experience (projects/products)

The use of an agile development approach on a new project or for a new product is more likely to succeed if the organization has experience of successful agile projects or product teams in the past. Using staff with experience on other successful agile projects or product teams on each new project or product team can be a major factor towards making new projects or product teams a success[6].