



Agile Software Development of Embedded Systems

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Agile Assessment Approach (based on the eight case experiences)

Abstract

This document describes the second version of the Agile Assessment Model.

Most of the information presented in this deliverable is based on the Hantro Agile Assessment paper which is submitted in the Software Improvement and practice journal. Public delivering of this deliverable is not allowed.



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CHANGE LOG

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1. INTRODUCTION

A great number of organizations utilize agile principles and practices in their software development [2, 3]. Agile software development methods (e.g. XP [4] and Scrum [5]), are used for improving the ability of the organization or project team to manage projects and develop products [2, 6]. Changing customer requirements, dynamic market situation and new technical challenges generate more demands for product development and business organization [4, 7]. In this situation, functional increments in a faster development cycle can be seen as one way of making the software development process more efficient. The purpose of using agile principles and practices is to develop products iteratively based on customer demands [3, 6]. However, only few organizations can adopt a specific agile method (e.g. XP) and use it as such [8, 9]. The purpose is rather to apply the most suitable agile practices as a part of the organization's current software development activities [10]. However, especially organizations that are accustomed to improving their process capability utilizing the traditional reference models (e.g. CMMI) have limited tools to find the most suitable agile practices for their specific software development context. To address the challenge of adopting agile practices, Kent Beck and Andres [11] have stated: "Find your current position with respect to each of the XP practices. Pick a practice whose purpose matches you own priorities for change." This approach may require evaluating the organization's current software development position and mapping the improvement needs with the most suitable agile based solutions.

This deliverable proposes an approach for Agile Assessment, also presenting the experiences and results of the use of this approach in eight case projects. The new idea in the Agile Assessment Approach is to make the agile principles and practices a part of the assessment process and to use the generated information for improving the software development processes, utilizing agility-based solution alternatives. Agility characterized as an successful exploitation of speed, iteratively and flexibility [12] may also be important in assessment, especially if the organization aims at increasing its ability to respond to changes in a dynamic market environment. In this case, the assessment would be lightweight and flexible, thanks to being based on the agile principles [13].

First section of this deliverable describes the background for the proposed agile assessment approach. Section 3 presents the steps of agile assessment and their comparison with the plan-driven models (ISO 15504 and SCAMPI). Fourth section illustrates the discussion of the agile assessment compared to the lightweight assessment models. Final section concludes the results with final remarks.



2. BACKGROUND

This section describes the background for agile assessment model which is based on the elements (see Figure 1) such as context of ISO 15504, processes of lightweight assessment models. Assessment procedure is also mapped with agile principles and takes the agile techniques as a part of the assessment process.

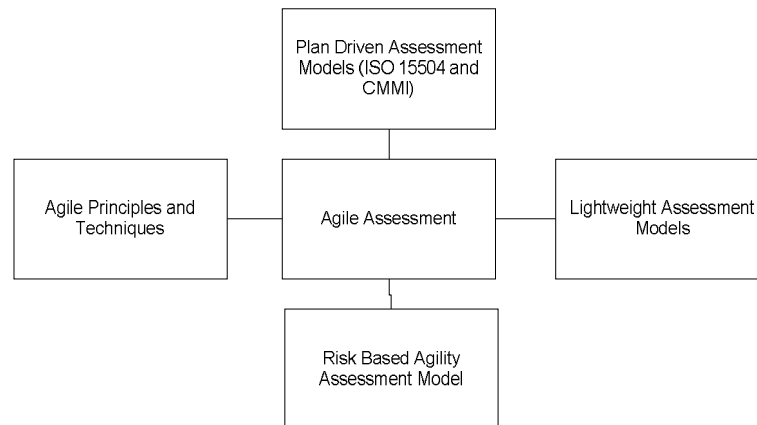


Figure 1. Background for Agile Assessment model

2.1 PLAN DRIVEN ASSESSMENT MODELS

Process assessment methods are generally draw upon one of the two process models: ISO 15504 [14] and CMMI [15]. Assessment is usually performed either as a part of process improvement initiative or as a part of process capability definition. For example, the ISO 15504 standard, in Figure 2, includes the following key elements: Assessment inputs, assessment indicators, process model and assessment output [14].

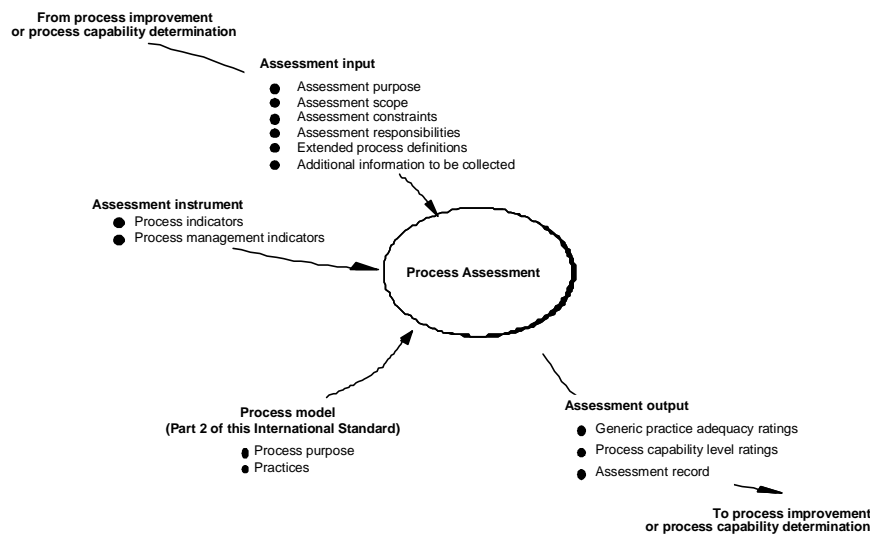


Figure 2. Context of process assessment in ISO 15504 standard [14]

In the model presented in Figure 2, the assessment is 1) started with the definitions of purpose, scope, constraints, responsibilities and the process itself, 2) continued by defining the assessment instrument (e.g. question list) and mapping the organization's current process with a standard process model, and 5) finalized with generic practice ratings and assessment records. ISO/IEC 15504 defines a generic way of drawing out a minimal set of requirements for assessment in order to obtain relevant results. However, the standard model is a reference model which does not provide any assessment method [16.]

The software Engineering Institute has also developed a method of its own called SCAMPISM [17] to support the assessment procedures in organizations. It is one of the class A methods (according to the CMMI appraisal Requirements) which means that assessment based on the SCAMPI [17] method requires quite a lot of effort from the assessed organization both in terms of preparation and assessment.

Because of these heavy, massive engineering based process descriptions [18], the traditional assessment is often seen as an opposite to agile thinking [7]. Organizations wishing to cut expenses by shortening the development time with agile methods may not wish to use that much money on current status evaluation. However, agile software development should be based on the organization's current status, which is evaluated with respect to agile practices, whose purpose matches the organization priorities for change [11]. Organizations aiming at basing their software development on agile principles use knowledge and understanding as human crafts [7], which are emphasized when employing agile values and principles [13]. In such a context, it may be justifiable to use agile principles and agility also in the assessment.

2.2 LIGHTWEIGHT ASSESSMENT METHODS


In the so-called lightweight assessment methods (such as Software Process Assessment Methodology (MARES) [16], the Rapid Assessment for Process Improvement for Software

Development (RAPID) [19], Express Process Appraisal (EPA) [20] assessment techniques) Software Process Initiation Framework (SPINI) [21] and Rapid Software Process Assessment to promote innovation SME (TOPS) [22], the purpose is to provide solutions for the needs of lightweight assessment methods, in order to be able to offer the techniques for implementing assessments rapidly and with low assessment costs in small or medium sized companies [20].

Anacleto [23] and McCaffery [24] have used the following criteria for comparing lightweight assessment models: a) low costs, b) detailed description of assessment process, c) guidance for process selection, d) detailed definition of assessment model, e) support for identification of risks and improvement suggestions, f) support for high-level process modelling, g) conformity with ISO 15504 i) tool support and j) public availability. Although these criteria are primarily developed on the basis of characteristics typical of small software companies [23], they are also valid in larger companies wishing to employ lightweight assessment because of their interest in adopting agile principles. The existing lightweight assessment models show some differences and similarities regarding their principles and processes, as shown in Table 1.

Table 1. Comparison of the principles and processes of the lightweight assessment methods

Method	Achievement of the Evaluation Criteria [23] [24]	Process
MARES	Low assessment costs, detailed description of assessment process and model, conformity with ISO 15504, no specific knowledge required from company representatives, public availability	Planning, contextualization, process assessment
RAPID	Low costs, detailed description of assessment model, conformity with ISO 15504, no specific knowledge required from company representatives	Organization, demographic creation, questionnaire, preparation of assessment plan, preparation of assessment instrument, assessment conduct, assessment report creation
EPA	Low costs, detailed description of assessment process, conformity with ISO 15504, no specific knowledge required from company representatives	Select process areas, develop appraisal schedule, conduct over briefing, site briefing, analyse key documents, examine and document objective evidence, generate appraisal results, presentation of the findings report
SPINI	Detailed description of assessment process and model, conformity with ISO 15504, no specific knowledge required from company representatives	Needs analysing, process assessment
FAME	Support for high level process modeling, conformity with ISO 15504	Not Available
TOPS	Low costs, detailed definition of assessment model, conformity with ISO 15504, public availability.	Stimulate interests in assessment and improvement, definition of improvement plans, data collection, database creation

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The basic principles in these lightweight assessment methods in Table 1 are to achieve low costs with the provided ready-for-use templates, tool support and process definitions. All of these methods are, however, planned to the plan-driven process evaluation. Any of these methods, however do not take agile process context into account.

The use of agile principles enables human centered assessment that is responsive to the organization's current needs while it also makes it possible to go different ways during the assessment. However, none of described lightweight assessment methods uses agile techniques as a part of the assessment procedure or fulfils the principles behind the Agile Manifesto.

2.3 AGILE PRINCIPLES AND TECHNIQUES

Several agile software development methods have been suggested in the literature, such as Extreme Programming (XP) [4], Scrum [25], Crystal methodologies [26], and Mobile-D™ [27]. All of these methods employ agile principles, such as iterative cycles, early delivery of working software and simplicity as defined in Agile Manifesto [28].

Manifesto for agile software development [28] is describing the 12 principles that should always lead the software development in organizations that are increasing their business agility. These Principles are the following: 1. Customer satisfaction and early continues value to software, 2. Welcome changing requirements, even late in development. 3. Deliver working software frequently 4. Business people and developers must work together daily throughout the project 5. Build project around motivated individuals. 6. Use face-to-face conversation to information during the development, 7. Working software is the primary measure for progress. 8. Agile processes promote sustainable development. The sponsors, developers, and users should be able to maintain a constant pace indefinitely, 9. Continuous attention to technical excellence and good design enhances agility, 10. Simplicity is essential, 11. Purpose to self-organizing teams. 12. At regular intervals, the team reflect on how to become more effective, then tunes and adjusts its behavior accordingly.

2.4 MODEL FOR RISK BASED AGILITY EVALUATION

At the moment, no methods exist for assessing agile software development. The approach of Boehm and Turner [29] provides a way for assessing the agile home ground of a software development project. However, this model maintains a strict focus on assessing the agile and plan-driven risks rather than finding the weaknesses and strengths of the used practices. Thereby it may not provide specifics on the state of the processes and may thus not give enough data on what needs to be improved.

In their analysis in Figure 2, Boehm and Turner [29] determine the following risks (i.e. five agility factors) affecting the selection between agile or plan-driven methods: 1) Size: The Number of people in the team, 2) Criticality: Products safety criticality, 3) Dynamism: Degree of requirements and change in technology 4) Personnel: The skill and experience



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of the team and 5) Culture: The support for agile software development provided by organization culture (e.g. developers' freedom to create technical solutions).

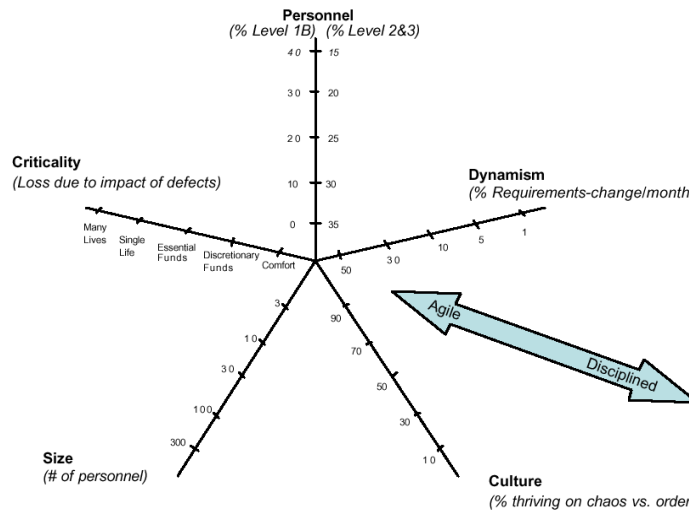


Figure 3. Boehm and Turner five agility factors [30]

In Boehm and Turner's [29] agility evaluation in Figure 3, each axis is labelled based on the respective agility dimension. When the data points of a project for each factor are joined and the resulting shape is located directly around the centre, this suggests the use of an agile method. Shapes that gather distinctly toward the periphery suggest using a plan-driven methodology. More varied shapes suggest the use of a hybrid method including both agile and plan-driven practices [29]. The risk based agility evaluation model provides comparable facts for agile project evaluation. While this can be used as starting point for agility evaluation and agile pilot project selection, it does not address any specifics regarding the application of agile techniques. The main challenge for the organization is how to tailor the different agile practices (i.e. activities) to its specific product development context and how to apply the most suitable agile practices as a part of the organization's current activities.

Based on the evaluation presented above, the following characteristics (i.e. requirements) were generated: It was found that agile assessment techniques were needed, but they could not be used for a complex evaluation including a full analysis of the base practices in the selected reference model (e.g. CMMI or ISO/IEC 15504). Rather, the new agile assessment approach should be flexible, lightweight and based on agile principles [13].

3. AGILE ASSESSMENT MODEL

In this section, the theory behind the proposed Agile Assessment approach is described, including a description of the agile assessment processes reflected against the context definition of the ISO 15504 standard [31] and process model of SCAMPISM [17]. Traditionally, the key purpose of process assessment can be either to capture information for describing the current capability of an organization's processes or just to improve the processes offering the required information of the strengths and weaknesses in specific process areas [14, 15]. However, Agile Assessment is software development assessment where the agile principles and practices are employed both in the planning of data collection and during the analysis of assessment results. It aims to be a light assessment technique (measured by the criteria of [23] [24]) supporting continuous improvement, while also taking into account the well known reference model (e.g. CMMI) goals.

Agile Assessment provides a better understanding of how suitable and effective the various agile methods would be in specific projects. During Agile Assessment (see Figure 4), the selected projects of the software development organization are evaluated through Agile Assessment elements such as agile principles (from the agile manifesto), agile methods, practices and tools (from agile literature), agile dimensions [29]. These elements are used when making the decisions on the most suitable agile practices for the current status of the evaluated projects.

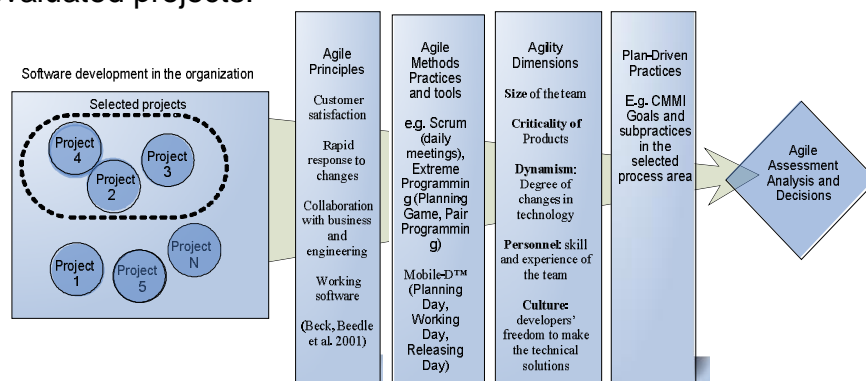


Figure 4. Elements of Agile Assessment

3.1 Steps of the Agile Assessment Approach

The process of agile assessment (Figure 5) involves two key iterations. The first iteration includes assessment preparation, where the assessment process, assessment goals and agility for the selected projects are defined and analysed. The second iteration (i.e. execution and learning) comprises data collection planning and a mapping of the analysis and improvements with the agile solutions. Both iterations are implemented as a joint effort, where data is collected and analysed in co-operation with representatives of the case organization.

SM SCAMPI, CMMI and CMM Integration are service marks of Carnegie Mellon University.

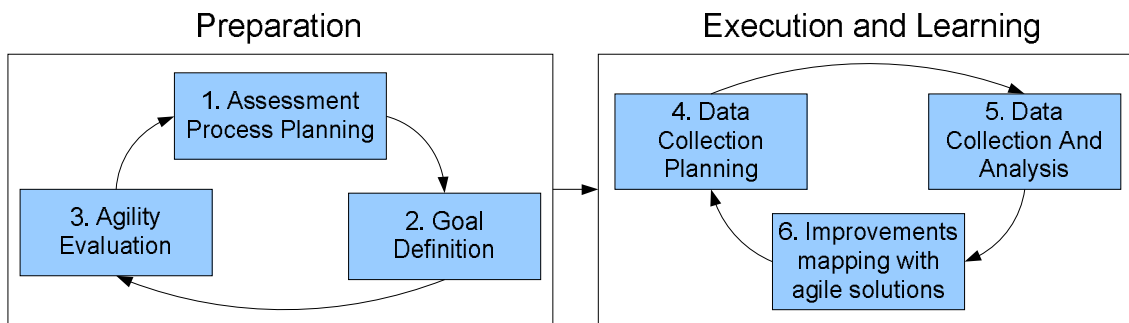


Figure 5. Process of Agile Assessment

3.1.1 Preparation


The assessment process in agile assessment is defined concisely, only specifying a general level schedule along with the stakeholders and key steps for the assessment procedure. The primary idea is that the planning of the assessment process is continued during the whole assessment so that the tuning and adjustment of the assessment goals is possible throughout the whole process. The goal of agile assessment is to improve the processes for finding the most suitable agile practices based on the organization specific needs defined during the agile assessment, regardless of the process capability determination.

The greatest additional tasks in this iteration compared to the traditional assessment is to determine which agile methods and principles the organization is already using and to evaluate the degree of agility of the selected projects based on the Boehm and Turner [29] agility dimensions. In this evaluation 1) the dynamism of the selected projects, 2) the size of the development team, 3) the criticality of the developed software, 4) the experience level of the developers and managers and 5) the support of organizational culture for agile software development are evaluated. The data required for risk based agility evaluation can be collected, for example, using a short questionnaire sent to the project managers or through discussions with the quality coordinator of the case organization. The agility evaluation is used for selecting the projects for Agile Assessment and retargeting the goal.

3.1.2 Execution and Learning

Second iteration of agile assessment (Figure 5) is including the steps of data collection, analysis and improvements mapping with agile solutions and data collection planning. Agile Assessment data can be collected using semi-structured interviews and workshops. In addition, various metrics data (e.g. effort, code size and development documentation) can be utilized in the analysis, depending on the scope of the Agile Assessment. The interviews and workshops in Agile Assessment are planned by studying the agile practices in the selected process areas depending on the defined process focus. The key purpose is to iteratively collect enough (and not too much) data for the next analysis cycle.

The data collection and analysis planning for the Agile Assessment can be based on a) knowledge of the different agile practices, b) definition of the software development success criteria and c) possible agile based solutions that can be used when improving challenges in the traditional software development. This analysis should be based on the process focus of the evaluated organization. Agile Assessment interviews and

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improvement analysis can be conducted using the traditional interviewing techniques. However, in Agile Assessment, the aim is also to discuss the possible agile practices. Therefore, compared to the traditional assessment, the interviews may also include additional discussion regarding the agility-based solution alternatives for the current weaknesses presented by the interviewees. The analysis and data collection planning is continued after each interview. The purpose of this is to evaluate if a sufficient amount of data is collected for the agile assessment workshop.

Some evidence documentation can be looked into in more detail during the agile assessment interviews and analysis if needed. The idea in agile assessment is to analyse documents only in situations where it is necessary for process understanding or result analysis. The decision about the required amount of documentation evidence is not made in the same way as in traditional assessment, i.e. before the actual assessment process, but rather between the interviews and during the analysis process. The idea of the first analysis step is to determine what the strengths and weaknesses of the assessed project or organization are. After this, in the phase of mapping improvements with agile solutions, the weaknesses of the selected projects are mapped with the agile solutions in practice. In the risk based evaluation model by Boehm and Turner, this mapping is performed at a higher level based on the agility arguments in the area of the presented five agility dimensions. In this phase, the strengths and weaknesses are first defined for each project based on the goals (e.g. Goals from CMMI) and on the previously implemented analysis of the software development challenges and agile based improvement alternatives in the given process area. A good way of wrapping up the results is to define the improvement needs and agile based solution alternatives in the organization's current process model. This enables a full understanding of the presented ideas during the final workshop. The results of Agile Assessment are further analysed in a workshop, which includes a presentation of possible problem solution alternatives in the organization's previous process descriptions based on the Agile Assessment results.

3.2 Process of Agile Assessment compared to the plan-driven assessment models

During the Agile Assessment it is also possible to use the goals and some selected practices of common assessment models (e.g. CMMI [15] or ISO/IEC 15504 [31]). In fact, the current assessment models provide the principal requirements for assessment planning also for Agile Assessment. Basically, this means that the context of agile assessment is the same as that of the ISO 15504 assessments presented in Figure 6 (white), though with the some additions (blue, grey when printed). The specifics of are described in sections 4.1-4.7.

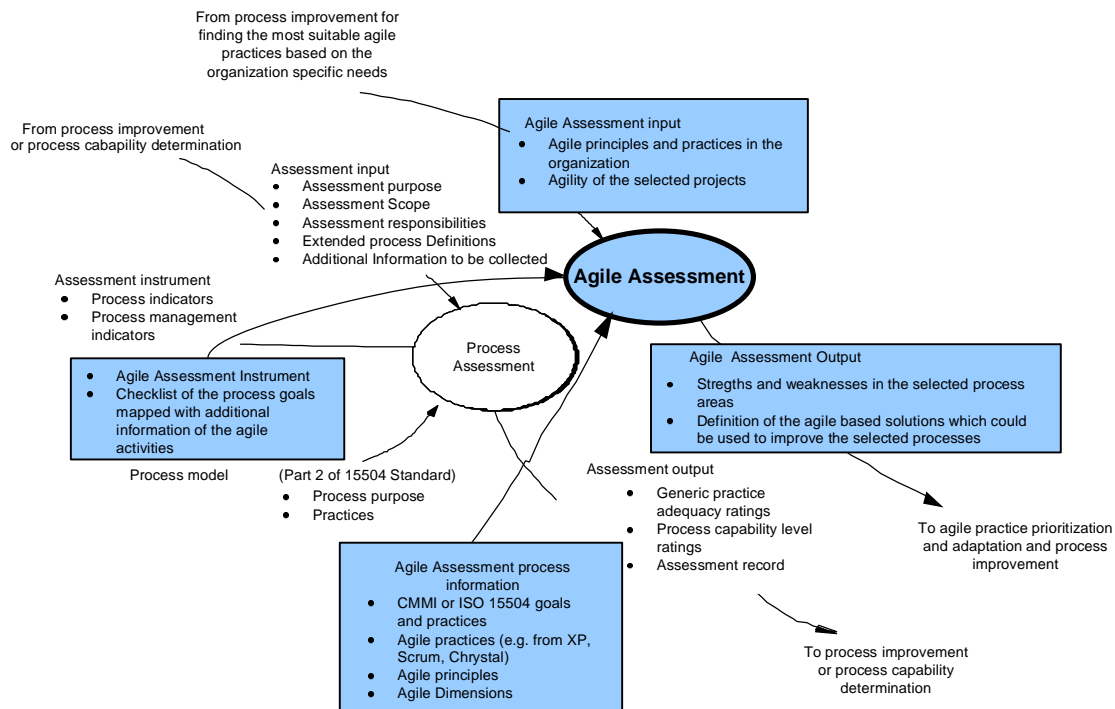



Figure 6. The ISO 15504 assessment context and the Agile Assessment approach

Usually, the traditional assessment (e.g. ISO 15504 Assessment) process contains at least the following five specified activities: planning, data collection, data validation, process rating, and reporting [31]. Similarly as in the traditional ISO 15504 based assessment, presented in Figure 6 the purpose, scope, responsibilities and process focus are vital inputs when starting the Agile Assessment work in an organization. Before the focus definition, the general framework for the assessment process is planned including the key steps and an overall assessment schedule.

Agile Assessment contains the same context as the ISO 15504 assessment, apart from the following differences. Firstly, agility and the used agile techniques in selected projects are defined in the beginning and used as an assessment input during the analysis. Secondly, an assessment instrument (i.e. checklist for interviews) is drawn up, including mapping with the plan-driven and agile practices in the selected process area. Thirdly, the agile principles and techniques are used as key elements during the analysis, where the goal is to find possible solution alternatives for the organization-specific improvement needs. Outputs of Agile Assessment, as presented in Figure 6, are a definition of the strengths and opportunities for change (i.e. improvement ideas) in the selected process areas, along with a definition of agile based solution alternatives that could be suitable for the improvement of the current state.

Compared to the SCAMPI process descriptions, the agile assessment has similar purposes but uses much lighter, iterative mechanisms for the assessment. In practice, this means that Agile Assessment does not involve any initial objective evidence analysis during the preparation. Objective evidence is analysed during the assessment data

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collection and analysis phases if needed. Additionally, agile assessment includes the evaluation of the agility of selected projects during the preparation step. 2. Data Collection planning, data analysis and mapping the results with possible solutions are implemented as a participative and iterative process, and 3. the results of the assessment are continuously reported using lightweight mechanisms and analysed with the relevant stakeholders of the current assessment in workshops, which support organizational learning.


4.0 Discussion

The purpose of this section is to assess Agile Assessment against the requirements that were presented for the Agile Assessment approach in section 2.2. According to these requirements, agile assessment should be 1) lightweight and 2) based on agile principles.

CMM/CMMI has been considered rather heavy in terms of effort and expenses [18]. As the purpose of agile development methods is to lighten the software process, the question is why to assess light processes (or processes to be lightened) with a heavy method? Organizations wishing to cut expenses by shortening the development time with agile methods may not wish to invest a lot of money on assessments even though they need evidence of how effective their processes are. The lightweight agile assessment approach adopts the agile principles (agilemanifesto.org). Table 9. shows the values and principles promoted in the approach.

Table 9. Lightweight principles of the approach

Assessment Principle	Agile Principle
Provide intermediate results to get feedback, keep assessment focus on customer goals, tune and adjust the assessment process during its implementation	Satisfy the customer through early and frequent delivery.
Plan, decide on data acquisition methods during the process together with the target organization, and make changes to the course of the assessment if required	Welcome changing requirements even late in the project.
Perform assessments and analysis cycles iteratively to get faster results for further analysis	Keep delivery cycles short
Involve management representatives in assessment goal definition and result analysis workshops as often as possible	Business people and developers work together on a daily basis throughout the project.
Involve organization's representatives into the process, ask the opinions of all the relevant stakeholders to support the commitment for the deployment of assessment results, offer concrete benefits for the project and management	Build projects around motivated individuals.
Favor face-to-face data acquisition methods	Place emphasis on face-to-face communication.
Primarily address improvement needs that directly affect the software development	Working software is the primary measure of progress.
Produce results that allow prioritizing, further analysis and deployment in the organization after the assessment	Promote a sustainable development pace.


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Involvement of a lead assessor who has the technical excellence in agile techniques	Continuous attention to technical excellence and good design.
Produce as simple assessment documentation as possible, enough data should be acquired, but no more	Simplicity is Essential.
Perform the assessments with a self organizing assessment team, all the members of which are creating ideas and solution alternatives for current improvement needs.	The best results emerge from self-organizing teams.
The assessment team should also evaluate their own working practices and improve them if possible. The Agile Assessment process will be improved in the future case studies.	The team is regularly reflecting on what, where and how to improve.

The primary goal in the assessment process is customer (i.e assessed organization) satisfaction. In Agile Assessment, this is achieved by providing immediate feedback to the representatives of the assessed organization all the time during the assessment process. The most important factor for customer satisfaction in the assessment situation is the achievement of the goals of the assessed organization. In some situations this require adjusting and tuning the assessment process for each assessment based on the organization's specific needs. The progression of an assessment is planned together with the target organization representatives and the representatives are expected to participate in the assessment process (e.g. as information providers, analysts and result interpreters). The course of assessment can be changed if so required by the organization or if the intermediate results show that changes are required.

In Agile Assessment, data collection and analysis are done iteratively so as to enable continuous feedback to the organization representatives. Management representatives are involved in the definition of assessment goals, data collection and result analysis workshops as often as possible. Other relevant representatives of the organization should also be considered during the assessment process by asking their opinions of possible solution alternatives. This also supports the commitment for deploying the assessment results. Face-to-face data acquisition methods are favoured. The primary interest in Agile Assessment is to solve the improvement needs that directly affect the software development activities in the organization. The results are kept as simple as possible and presented in a form that allows prioritizing and further analysis in the internal improvement meetings of the assessed organization.

The lead assessor should have the required technical excellence in the assessment process and agile techniques. Agile Assessments are preferably done in flexible, self organizing assessment teams that are continuously reflecting how to improve their assessment development processes. Enough assessment data should acquired (enough that the strengths and weaknesses could be evaluated in the selected process areas and mapped with the agile techniques), but no more - the decision of adequate amount is made during the assessment process together with the organization's representatives, not

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beforehand. Intermediate results are provided for collecting feedback and, consequently, for tuning the process.

Comparisons of the so-called light assessment methods (RAPID, SPINI, FAME, MARES and EPA) have been widely published in the literature [23] [24]. In the following, the Agile Assessment approach is evaluated and compared with the lightweight assessment methods utilizing the same criteria as Anacleto [23] and McCaffery [24] have used for comparing lightweight assessment models. The limitation of this evaluation is the restricted validity of the evaluation criteria in this context. In Anacleto's analysis, the following criteria are based on typical characteristics of small software development companies. However, the assessment goals large organizations interested in employing agile methods are similar to those of small companies. They are looking for low-cost assessment offering direct support for employing the improvement solutions in their specific software development context.

Low Costs


Looking only at the overall costs of the assessment, the Agile Assessment case studies (in Hantro, Nokia and F-Secure) required more effort than many of the presented light assessment methods (e.g. in the Express Process Appraisal Method, the assessment required about 45 person hours of the appraised organization's time and a similar amount of assessor time [24]). This was because the time used for agile assessment could not be separated from the time used for research work (i.e agile assessment approach development). Overall, Agile Assessment required about two weeks of effort from the evaluated organisation's time and a similar amount of assessor time. However, the Agile Assessment model was developed parallel with the case studies. Consequently, the assessor did not have any ready-for-use approach, guidelines or predefined list of questions that could be utilized directly with the specific agile based solutions findings. In addition, a lot of the time was used in research work where the agile based solutions and available agile methods were evaluated for the selected process areas and for the analysis of the agile based solutions.

Detailed description of assessment process

The process of Agile Assessment is based on the assessor's prior experiences with ISO 15504 assessments and on an analysis of the process descriptions in lightweight assessment methods. Looking at the process of Express Process Appraisals, for example, the first agile assessment case had many similar stages even if some new steps were included in that procedure for agility purposes. To serve the purposes of tuning and adjustment, the assessment process in agile assessment should have a framework which would allow the focus and direction of the assessment to be easily adjusted also between Agile Assessments sessions. Therefore, the assessment procedure should be supported by a framework representing the key activities, such as short planning and iterative execution of the assessment, but without any detailed descriptions of the assessment procedure.

Support for identification of risks and improvement suggestions

Most assessment methods (SPINI, FAME, TOPS, EPA) provide support for identification of risks and improvement suggestions [23, 24]. Agile assessment provides improvement

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suggestions mainly based on the agile based software development techniques. The new idea in the proposed agile assessment method is to cater to the agile practices and agile principles as a part of the overall assessment procedure, where the purpose is to find agile based solutions for the specific improvement needs of the organization.

Support for high level process modelling

The FAME method is currently the only assessment method providing support for organizational or high level process modelling [23, 24]. In the Hantro and F-Secure cases, the used Agile Assessment approach also offered support for high level process modelling at the organization level. Although this was originally not planned for the assessment procedure, it was implemented during the analysis when it became clear that agile based process solutions required changes in the current processes. During the assessment, it was also disclosed that a good way to present results to the management and interviewees was to show the changes through the organization's current process model, meaning that the results were presented in terms and process model mechanisms familiar to the organization. In Nokia case, the high level process model development can not be supported because of the scope where the purpose was to evaluate only one case project in Nokia environment.

Conformity with well-known reference models (e.g. ISO/IEC 15504)

In section 4.0, the conformity of the proposed Agile Assessment model with ISO 15504 and SCAMPI was presented. In the case studies, the Agile Assessment results were also mapped with CMMI goals and practices for the selected process areas.

No specific software engineering knowledge required from company representatives


According to the analysis presented above, the FAME and TOPS assessment methods require specific knowledge of the assessment model from the assessment participants [23]; [24]. Agile assessment requires the lead assessor to have specific knowledge of the agile techniques and assessment model. In the Agile Assessment case, also the representatives of case organizations had the required knowledge of the agile principles and possibilities.

Tool Support

Since the first agile assessment cases were performed for research purposes, there was no tool support for Agile Assessment. The experiences gained in Agile Assessments along with the tool support and the experiences of software development challenges and agile based solutions would help to reduce the assessment effort. This is because the analysis of the most suitable agile practices for resolving different problems requires a great deal of background information about the different Agile Assessment elements, agile techniques and their benefits in different situations.

Public availability

The first version of the Agile Assessment method has been published in [32]. In future, the Agile Assessment model will be further developed as a part of deploying the agile technique in different companies. The results of the improvements will be published later. However, the templates and guidelines for Agile Assessment have not been made publicly available.

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One of the key restrictions of the lightweight assessment models is that they only provide a very limited set of process areas from which to select the process areas to be assessed [24]. Agile Assessment does not have this kind of limitations. The idea in agile assessment is to select a suitable set of process areas based on the organization needs, to make a concise plan and then decide upon the data acquisition methods to be used during the process together with the target organization.

4. SUMMARY AND CONCLUSIONS

Agile methods and practices are increasingly used for addressing the challenges of dynamic markets [29, 33] in organizations that are accustomed to improving and maintaining their process capabilities by utilizing the traditional reference models (e.g. CMMI). However, only a few of these organizations might be able to use a specific agile method, such as Scrum or Extreme Programming, as such or on its own. Rather, they may deploy a selected set of suitable agile practices as a part of the organization's existing high maturity product development practices.

The tools available today for evaluating agile based improvement solutions against specific improvement needs are very limited. Even if organizations are committed to achieving the goals of some specific reference models (e.g. CMMI), they may not necessarily be willing to assess their processes with heavy methods, especially if they are inclined towards adopting agile methods and practices in their activities and operations. Some agility evaluation mechanisms have already been developed for the project level. However, the existing methods lack support for a flexible, lightweight assessment of the most suitable agile practices to fit the specific organization needs.

This deliverable described an approach for Agile Assessment, the purpose of which is to help organizations to find suitable agile practices for improving specific aspects of their software development work. The proposed approach is created based on the experiences and key findings of the eight project assessments. The new idea in the proposed Agile Assessment Approach is to incorporate the agile principles known from the Agile Manifesto [13], along with related agile practices, into an iterative assessment process and to use the information of the possibilities offered by agile techniques for defining solutions for the improvement needs of traditional software development projects.



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