The Challenges and Approaches for Methods for Assessing Organisations using CMMI[SM*]

1. Introduction

With the advent of CMMI[SM] the SEI has produced a model which is more widely applicable and has more detail than any of the previous models which it has produced. This new model has opened some new possibilities and some additional challenges in carrying out assessments using the model. It is the purpose of this paper to explore some of those challenges and some of the issues associated with using the new model.

2. Differences between CMMI[SM] and Software CMM

The purpose of this section is to indicate the main differences between the two models rather than being a definitive exposition on the changes in the models. The main areas of difference are

a. CMMI has two representations Staged and Continuous

CMMI covers two views of how to go about process improvement. The staged representation identifies a road map for improvement and defines the Process Areas that must be addressed at each stage. The second representation is the continuous which allows organisations to choose the process areas they wish to focus upon for improvement and the sequence in which they are tackled. In the continuous representation, an assessment measures the maturity of each process area separately and this is referred to as a capability level for the process area.

The advantage of having both representations is that it provides more flexibility on the way an organisation can approach its process improvement and still get support for their approach from the model.

b. CMMI covers more disciplines

CMMI now covers more disciplines. The first version combined Software Engineering and Systems Engineering and subsequent versions extended this to cover Acquisition and Integrated Development Teams. The advantage of having more disciplines is that more of the organisation can use the model and more of the activities of the organisation can be covered in one assessment.

c. CMMI has more content

The CMMI now covers more process areas and more disciplines than Software CMM. If we take the staged model and compare the cumulative number of practices at each maturity level as the maturity level is increased there is a rough indication of the increase in size. The result is shown in the chart below. At maturity level 2 there is only a 3% increase in the number of practices, the increase at maturity level 3 is 54%, at maturity level 4 is 50% and at maturity level 5 comes down to 36%. The other CMMI[SM] models add process areas and practices at level 3 and hence increase this difference at level 3.

3. The Challenges

An assessment method must provide added value for the organisations assessed at a reasonable cost. For the method designer and the Lead Assessor this means balancing the requirements for accuracy of the results, an appropriate scope of the assessment and a

[*] CMM and Capability Maturity Model are registered in the US Patent and Trademark Office. CMM Integration, CMMI and SCAMPI are service marks of Carnegie Mellon University.

reasonable level of effort to conduct the assessment. The changes noted above led to the following challenges in the assessment method used with CMMI.

a. Choosing the Process Areas for an assessment particularly when using the Continuous Representation. With the advent of the continuous representation there is an opportunity to tailor the assessment closer to the needs of the organisation. This should allow the assessment to be optimised to focus on precisely those processes which add the most value to the business or can potentially give a large increase in stakeholder value.

   The approach that has been used by Compita is to understand the business and its goals. This can be done using such tools as Stakeholder Analysis and Value Add Chain Analysis. Using this analysis the important parts of the business can be identified and thence the key processes which support the business goals. Thus by improving the performance and capability of these processes it is possible to improve the business. This sort of analysis produces an improvement programme which is well aligned to the organisations business goals and is readily seen as being of positive benefit to the organisation.

b. The model covers more disciplines so requires a wider range of expertise in the assessment team. On assessments using the Software CMM it is not difficult to assemble an assessment team with the right experience in software development and project management. With the potential increase in the range of disciplines, on an assessment with a wide range of disciplines getting the right experience into the team may be more problematic.

c. The CMMI model has more process areas and practices than the equivalent in the CMM model it therefore requires the collection of more data. With the increase in size there is pressure to contain the increase in time spent in collecting data. There are two areas in which data is collected where we might expect to see economies.

   d. Interviews

   e. Planning phase

   The following sections discuss each of these in turn.

4. Interview Strategies

There are a number of strategies which can be used to alleviate the time taken on interviews and the length of the on-site period of the assessment.

a. Multiple Teams. The PPA and SCAMPI methods make use multiple assessment teams to collect the assessment data allowing interviews to be run in parallel. This can dramatically reduce the elapse time of the assessment. It has been found to work well in practice while providing accurate assessment data.

b. General questions versus KP questions. The CBA IPI and SCAMPI interview style use very general questions to initiate a discussion that reveals evidence for the implementation of key practices and uses tagged notes to generate observations. The approach used by PPA is much more focused on practices in the process area description. This still uses generalised questions but these are based on the practice statements while avoiding direct quotations of the practice statement. This helps achieve a high level of coverage in each interview and means that coverage can typically be achieved with fewer interviews. Observations are noted directly against the practice during the interview which saves time during consolidation.

c. Single versus Group Interviews. All the methods allow the use of group interviews. One strategy might be to make greater use of group interviews to get greater coverage more quickly. In the opinion of the author this does not work based on the experience of running group interviews in assessments.

5. Collecting Data during the Planning Phase

A certain amount of data on the organisation needs to be collected to be able to plan an assessment. This can be extended to cover more of the sorts of data that is seen as associated with the assessment data gathering proper.

a. Questionnaires. All the methods allowed the use of questionnaires. In practice, the author has found that these are only of limited value in getting an insight to the organisation.

b. Document Table. Another approach is to use a table which shows how the organisation? documented procedures satisfy each of the key practices. This helps the assessment team to locate those areas of the organisation? documents supporting the key practices and helps reduce the document review time. It is not a part of any of the methods looked at.

c. Process Implementation Indicator Document. An innovative approach used in SCAMPI V1.1 is to use a Process Implementation Indicator Document which provides evidence or indicators of how the organisation implements a key practice. This is an organisation resource that the organisation will supply at the start of the assessment and the lead assessor will check that it is sufficiently complete before the assessment commences. The initial generation of a Process Implementation Indicator document is likely to involve a lot of effort especially for an organisation just starting its first assessment.

6. Conclusion

The CMMI is a valuable addition to the set of models for use in process improvement and for assessments. It covers a lot more ground than previous CMM models as it can be used to cover more activities of an organisation during an assessment. With these advantages come a number of challenges some of which were discussed in this paper. These challenges have meant that there is a need to develop new approaches or adopt existing techniques from elsewhere to more fully exploit the potential of the new model. It has also open up new possibilities in tailoring the model to more closely match the business of the organisation being assessed and potentially provide much more added value to assessments.