

Test Maturity Model integrated (TMMi) for Process Improvement

Introduction – Why do we need measureable and verifiable process improvement in testing?

Efficient and effective processes are a cornerstone for each testing organization, yet few seem to have transparent view of the maturity and efficiency across projects and applications. Moreover, key questions such as “Where do I start improving?”, “How can I establish the changes so that they are part of our culture?” and “How do I know that the improvements actually have an impact on my bottom line?” need to be answered before starting with a process improvement journey, otherwise experience has shown that a lot of paper is being produced without real change. In order to deliver real impact through process improvement activities it is important to understand the structure of the underlying process framework and how to use this within each specific situation. Many useful, but proprietary (or linked to individual persons) process improvement models exist in for testing processes. These however fail to address the need for an industry-wide and open standard that is continuously maintained and improved.

The Development of TMMi as a Reference Model

The Testing Maturity Model Integrated (TMMi) serves the purpose of defining testing processes in a transparent, open and standardized way. Originally developed as TMM by the Illinois Institute of Technology, the TMMi Foundation, a not-for-profit organization based in Ireland continued this work in 2004 with the objective to create an internationally accepted standard:

1. To develop an International TMMi® Standard for Test Process Maturity Assessments Model, including the development of an assessor's scheme and any qualification requirements
2. To facilitate international acceptance of the TMMi® Standard via recognized international bodies and place the standard in the public domain.
3. To promote and support a single, publicly available, international Test Process Maturity Assessment scheme for the benefit of IT testing professionals and Senior Management.

The TMMi Foundation is being supported by many partners from the industry and academia. Each current version of the reference model can be downloaded at www.tmmifoundation.org. The continuous development of the model is a collaborative effort, currently a team consisting of members from Accenture, AppLabs, Cognizant, Experimentus, the Hong Kong Polytechnic University, Improve QS, SysQA und Wipro are working on completing Maturity Level 4 and 5 (planned for December 2010). Everyone is welcome to join the TMMi Foundation as an individual member (or a corporate sponsor) and thus actively shaping the model and assessment methods.

Overview of TMMi

The TMMi standard describes the evolution of a test organization using a 5-staged approach to process maturity. Reaching a new level documents a significant improvement within the organization in terms of efficiency and effectiveness of processes. At the same time this serves as a foundation to reach the next level of process maturity within other test domains. TMMi therefore addresses the need to give organizations reference guidelines for continuous improvement without being too prescriptive.

The five maturity levels in TMMi represent stages a test organization can be in and achieve. A test organization at the lowest **Level 1 (Initial)** of the TMMi standard has no defined testing processes. Instead testing is considered as part of debugging and is being carried out ad-hoc, in an unstructured and uncontrolled manner typically by developers (or non-dedicated testing professionals such as business users). At **Level 2 (Managed)** testing is a managed process and is clearly separated from debugging. A test strategy exists and the test approach is driven by a test policy. Furthermore the test approach is well

planned and controlled but test scope focuses primarily on functional testing. If testing is no longer considered as a step following after the build phase but is fully integrated into the development lifecycle a testing organization is considered to be at **Level 3 (Defined)**. At this maturity level all test processes are standardized organization wide, derived from a general test policy and also include non-functional tests. At **Level 4 (Management and Measurement)** quality and process efficiency are being statistically measured throughout the whole development lifecycle and the test process is being managed using this information. The testing process of a testing organization at **Level 5 (Optimization)** is fully embedded into the organization's quality management and continually improved. Test does not only continue to focus on finding defects but also tries preventing them.

The TMMi standard defines several different process areas for each level. The successful implementation of these process areas can be easily measured by using specific goals. Specific practices support reaching these goals and allow the test organization to implement these practices. Each practice within TMMi comes along with typical deliverables and process steps and is further explained by giving clear examples allowing the implementation of these practices by using concrete activities. Setting up a company specific glossary (e.g. using the ISTQB-glossary as a basis) will be worthwhile to develop a common understanding of technical terms used within TMMi for all involved individuals.

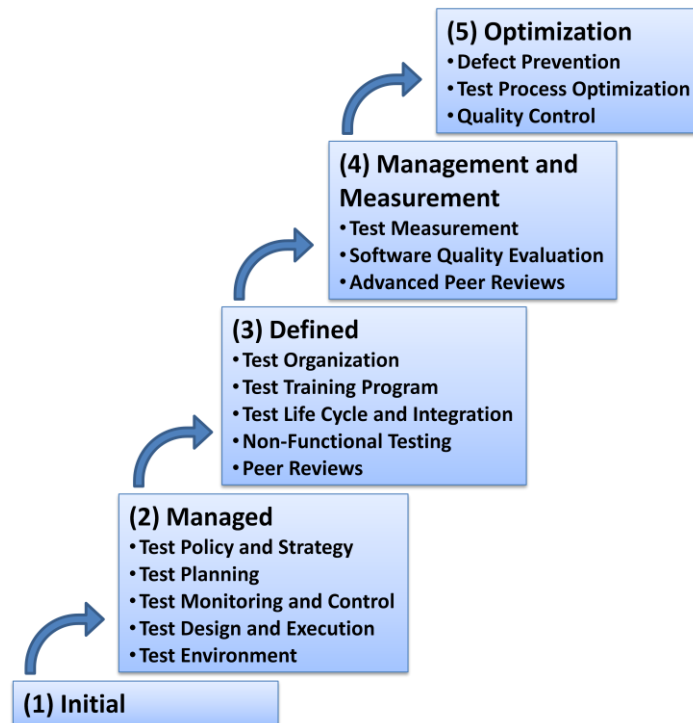


Figure 1 - TMMi Maturity Levels

Process Improvement with TMMi

Based on these methods the TMMi reference model can be used both to define the initial state and the target of testing processes. The transparent (and readily available) structure, which is aligned with CMMI and ISO 15504, allows IT leads and Test Managers to define the current state of process maturity within their area of responsibility by conducting an As-Is-Analysis of their current processes against the specific goals defined in TMMi. A way to facilitate this assessment is Accenture's patent-pending Test

Assessment Framework, which can serve as a questionnaire to elicit the individual practices and consolidate them across units.

Based on the information gathered in the assessment interviews and through document (evidence) reviews the specific practices, sub-practices and examples contained in TMMi can then be used to elaborate on obvious improvement potential and provide the groundwork for the implementation of improvement recommendations. TMMi as an open standard allows all stakeholders (from responsible management to individual project members and the business and operations team impacted by poor quality or schedule performance) to analyze the impact of any improvement recommendations, prioritize them and adapt the change management journey to the applicable situation.

Process improvement projects based on these improvement recommendations should not be taken lightly, but set up and planned as a separate project. This project should consist of several phases or work packages so that the implementation of each recommendation can be measured and done relatively independently of ongoing work. Remember that each improvement recommendation is (productive) criticism of the current status quo. Therefore each characterization of current behavior should be done on the basis of processes, not people in order to achieve broad buy-in to the recommended changes. Using the assessment results as an indicator of current behavior helps with defining gaps against the TMMi goals as well as the goals (vision, mission) for the company itself. If no such test policy and mission statement of testing exists this should be the first action item for the process improvement team. Existing gaps and strengths can be identified and utilized to define concrete objectives, e.g. quality improvement, cost reduction, employee and/or customer satisfaction, and reduction of time-to-market. The specific practices within TMMi can then be put into individual work packages for the process improvement team.

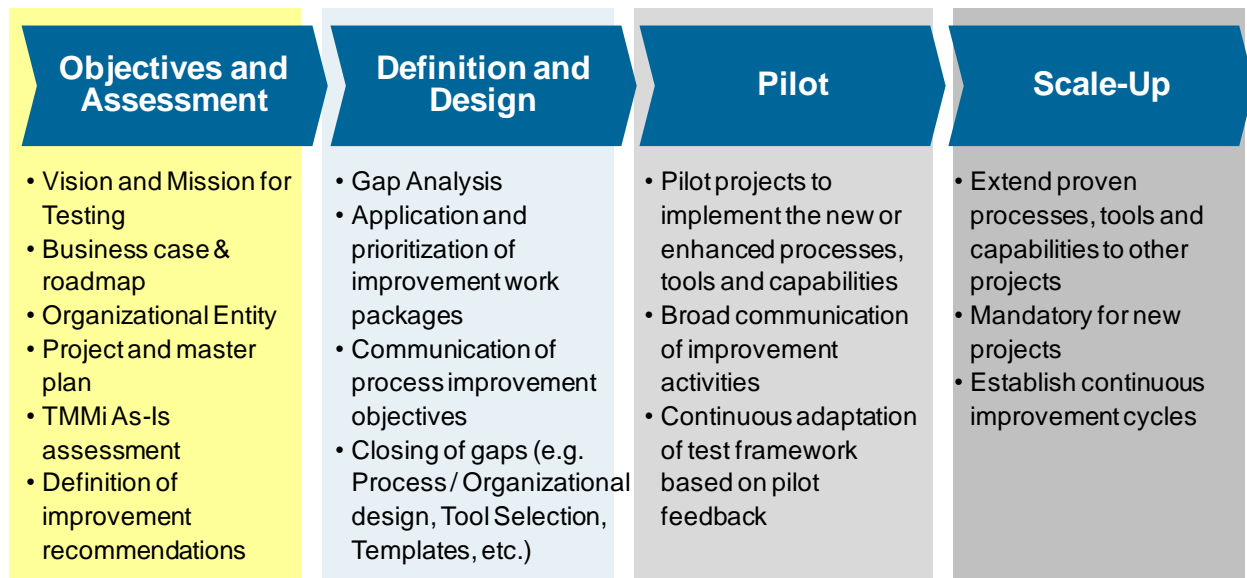


Figure 2 - Process Improvement Phases

After the thorough analysis of the work packages they can be verified in pilot projects and refined based on the actual results to roll out their implementation to other parts of the test organization. Supporting trainings, change management measures and communication are very important in this step in order to gain acceptance for these changes and make them understandable to a broader audience.

Why is it important to use an open standard that can be easily verified and referenced and how does this help with gaining acceptance for process improvement? Take a look at the following illustrative example from one of Accenture's clients:

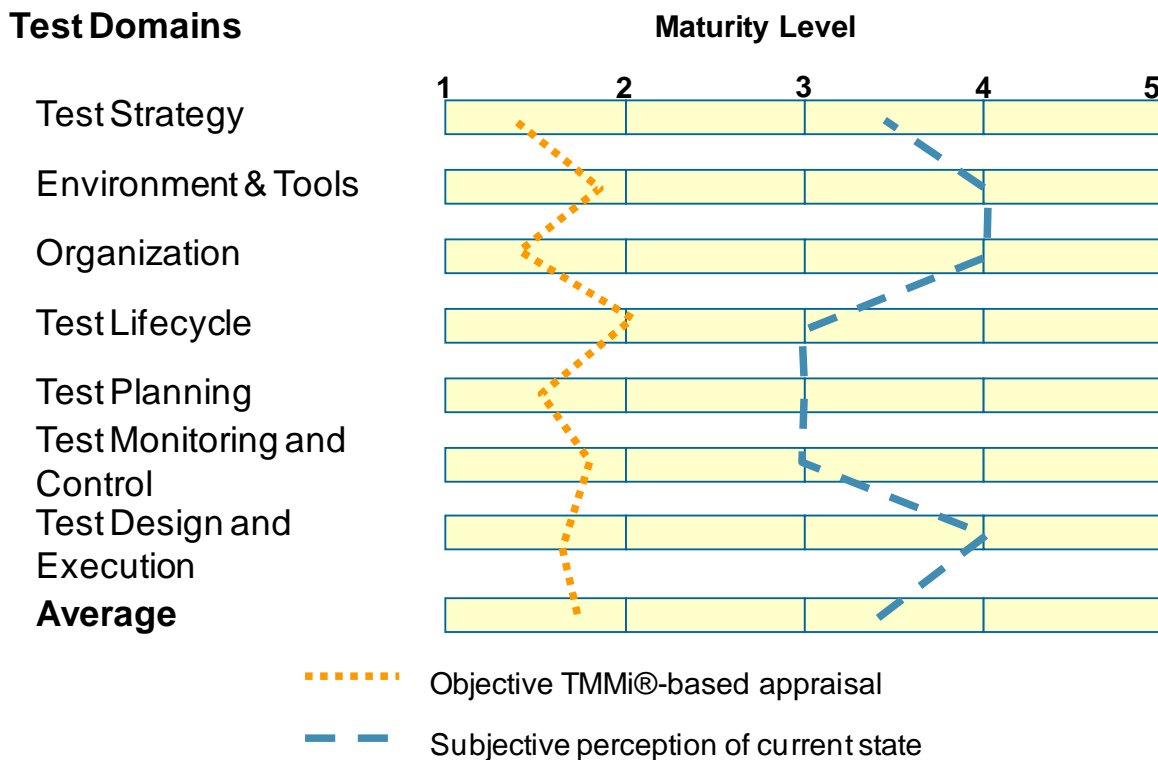


Figure 3 - Sample Assessment Result and Self-Perception

In this figure the subjective current state of testing processes as perceived by various stakeholders has been plotted against the results of a TMMi-based appraisal carried out with the same stakeholders and some of their team members. Obviously the stakeholders believed to be operating at a much higher level of proficiency already, but how can this happen? Surely everybody should understand process maturity and be realistic enough regarding their own process performance? Let's take a look at some common pitfalls for wrong perceptions and failed expectations towards the outcome of a test process maturity assessment:

- #1 **Understanding of the process itself:** We see this over and over again – what “test design” means to one person can be a completely different deliverable or process to someone else. While TMMi provides a foundation for these process areas, it depends heavily on the knowledge and experience of the person being asked about process performance to adequately assign a maturity level. Remember that the TMMi appraisal will validate whether each goal of the process area has been met, whereas the stakeholder might simply think about how “Test Design” is being performed currently without taking all the detailed goals and practices into account. This is very similar to estimating work plans and project efforts – unless you very clearly define the scope in terms of deliverables and expected process steps, the estimate will always depend on the viewpoint of the estimator.
- #2 **Filtered information on process performance:** Depending on the level of stakeholders it could potentially be a problem that the information they are getting on process performance is being filtered by their direct reports. They might get isolated issue reports and “lessons learned”

accounts on processes not working, but due to problem #3 and the inclination of their direct reports to report everything as green (or maximum yellow/orange, but never red) they might not have the full picture and are therefore more confident.

- #3 **Lack of verifiable, measureable process performance:** Measurable process performance already necessitates a test organization to be at maturity level 4 in TMMi since you first need reproducible processes across your organization to effectively measure the performance across the organization. Therefore many organizations simply do not have the means to objectively evaluate process performance and rather stick to individual opinions and process examples.
- #4 **Insufficient appraisal information:** These “individual opinions” can also be a problem for the appraisal team itself. Depending on the experience of the appraisal team, the preparation done for the appraisal and the time available, the appraisal might be based on very selective evidence and therefore not show the whole picture of process performance. Group interviews have proven to be a good way to get information, reducing the time necessary for everyone involved and fostering an atmosphere of open communication (make sure there are no direct reports in one group, the group should always consist of more or less the same hierarchy level). Get evidence before the interviews in order to be able to ask pointed questions, and keep the questions open-ended in order to not lead the interviewee down a path of answers.

These potential pitfalls illustrate the importance to support any process improvement initiatives with common and reference-able models, while using change management initiatives to make sure all stakeholders understand the assessment about to take place.

Consider these additional examples of mis-perception of process maturity. The following excerpts of surveys (one conducted by Experimentus Ltd., the other by Forrester Consulting on behalf of Accenture) show that it will take some time before consensus builds in the industry regarding maturity profiles and their meanings.

Industry Sectors

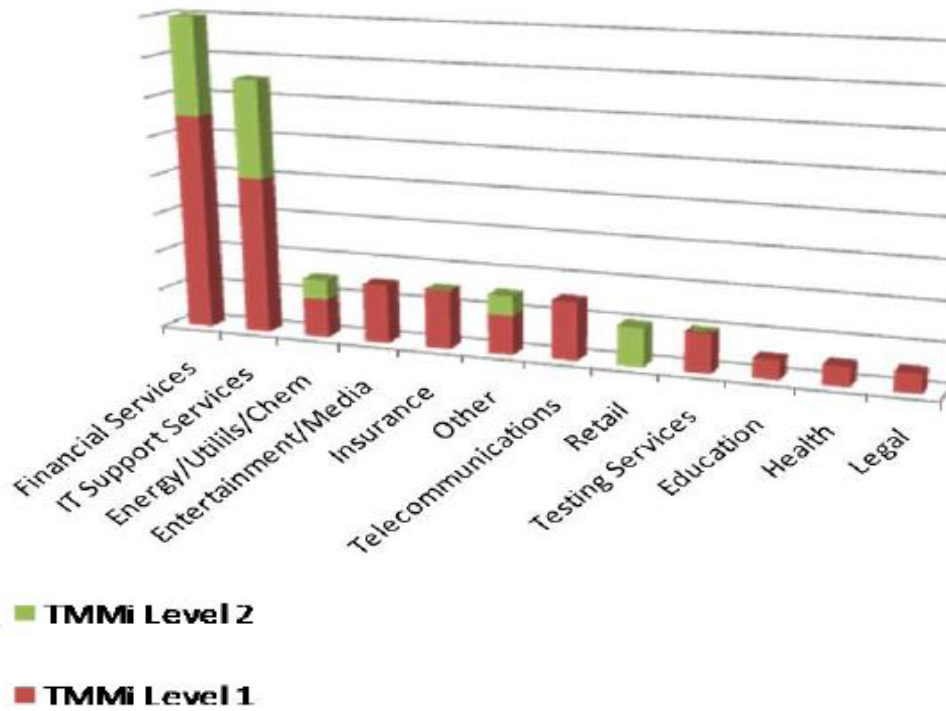


Figure 4 - Survey Results from Experimentus Ltd., 2009

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A study conducted in 2008/2009 by Experimentus with over 100 respondents shows that 72.5% of respondents believed their processes to be at Maturity Level 1 – a probably quite realistic if pessimistic assessment of their situation but then surprising given the amount of mission-critical systems in these industries.

5. “At which maturity level would you rate your current software testing operation/organization?” (n=201)

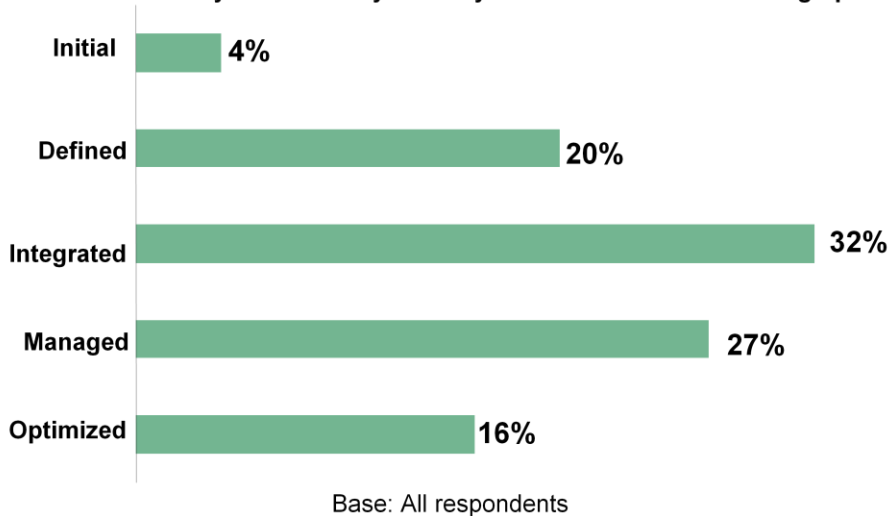


Figure 5 - Survey Results from Forrester Consulting, 2009

Source: Online survey of 201 US IT decision makers. Conducted by Forrester Consulting on behalf of Accenture in 2009.

On the other hand results of an online survey of IT decision makers conducted by Forrester Consulting on behalf of Accenture come across as maybe a bit too optimistic (with only 4% at Maturity Level 1 and 43% at Maturity Levels 4 and 5). Maybe the fact that >80% of the audience surveyed were senior IT decision makers lead to the perception of their organization's maturity as somewhat biased and maybe overstated, painting a too optimistic picture? Or maybe the definitions of maturity levels might have been misinterpreted by the interviewees and hence resulted in these self-assessment results. These two examples show that while many test organizations are interested in improving their testing capabilities, many struggle with the definition of their current situation and will therefore have a difficult time explaining the need for improvement and change.

TMMi has the potential to be the open standard for process improvement the Quality and Testing industry needs. It solves the dependency problem of other models by using an open and collaborative method to include various viewpoints and can therefore help test organizations with improving the effectiveness and efficiency of their testing processes.

The authors

Accenture is a global management consulting, technology services and outsourcing company with more than 186,000 people in 49 countries. Accenture Test Services has have been providing testing services for more than two decades, both on-site and through our Global Delivery Network.

Matthias Rasking leads Accenture Test Services in the German-speaking markets as well as Accenture's global Testing Community of Practice of over 10,000 testing practitioners. With more than 10 years of experience in the Testing and Quality Assurance space, Mr. Rasking holds or has held certifications in software engineering practices such as CMMI, ITIL and as an IEEE Certified Software Development Professional. Mr. Rasking is the Working Group Manager for Model Development and Maintenance for the TMMi foundation. He has supported many multi-national clients in various industries with becoming high-performing businesses by establishing a structured and strategic approach to quality assurance.

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