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Testing Maturity – Where Are We Today?

Results of the first TMMi benchmark

Column

With the full TMMi model (release 1.0) having become available recently and the rapid growth in TMMi interest and recognition world-wide, my contribution to Testing Experiences this time had to be on the Testing Maturity Model integration (TMMi). As the first version of the TMMi was already published four years ago, many organizations have since used the TMMi to evaluate and improve their test processes. Together with Jan Jaap Cannegieter, also my co-author for the "The Little TMMi", I analyzed the results of almost fifty (50) TMMi assessments. The results provide an indication of testing maturity today.

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TMMi: the model

TMMi is a non-commercial, organization-independent test maturity model. With TMMi, organizations can have their test processes objectively evaluated by certified assessors, improve their test processes, and even have their test process and test organization formally accredited if it complies with the requirements. TMMi uses the concept of maturity levels for process evaluation and improvement. Furthermore, process areas, goals, and practices are identified. An overview of the TMMi maturity levels is provided in Figure 1. Practical experiences have already shown that applying the TMMi maturity criteria will improve the test process and is likely to have a positive impact on product quality, test productivity, and test lead time.

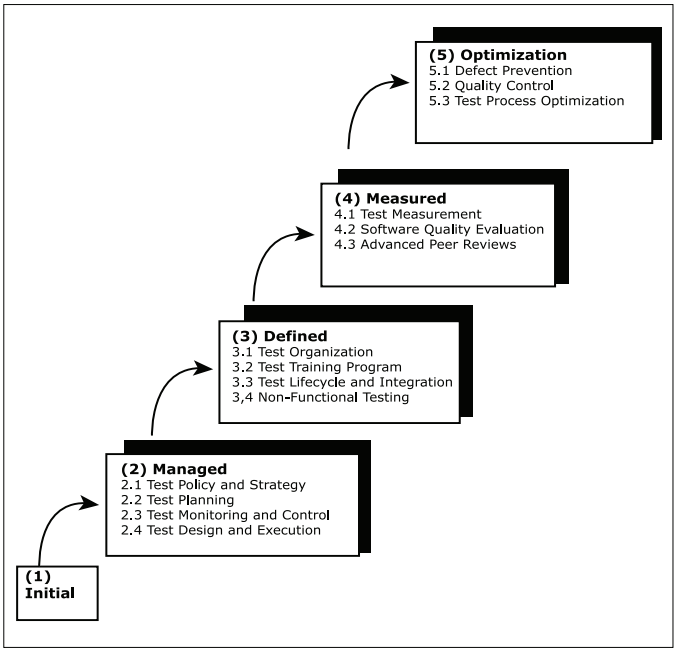


Figure 1: TMMi maturity levels and process areas.

TMMi assessments

A TMMi assessment measures the maturity of test processes. An assessment can also be used to determine whether an organization has achieved a certain maturity level or not. The results of the assessment will be used to formulate recommendations for improvement. The TMMi Assessment Method Application Requirements (TAMAR) describe the requirements that TMMi assessments must comply with. TAMAR distinguishes two types of assessments: formal and informal. A formal assessment has enough depth to officially determine the extent to which an organization complies with the requirements as defined in TMMi. An informal assessment does not lead to an official statement regarding test process maturity – it only provides an indication. From the analyzed TMMi assessments, 14% were classified as being formal TMMi assessments and the other 86%, therefore, were informal assessments. Based on both authors' experiences, these numbers are representative of the TMMi assessment market.

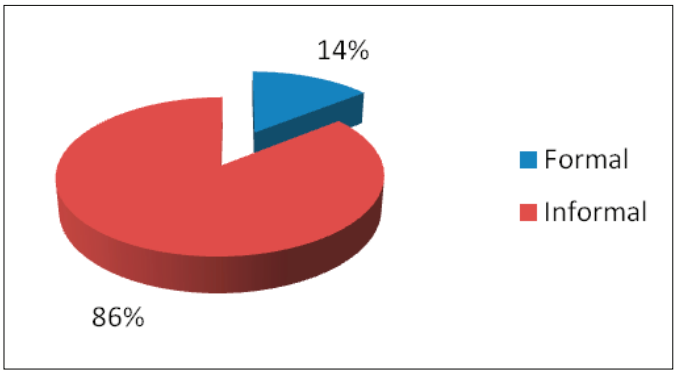


Figure 2: TMMi assessments by type.

Maturity levels

Based on the benchmark results, no less than 84% of the test organizations assessed are still at TMMi maturity level 1, a mere 10% are at TMMi maturity level 2, and only 6% of the organizations are at level 3. None of the organizations that were assessed fulfilled the requirements of TMMi levels 4 or 5.

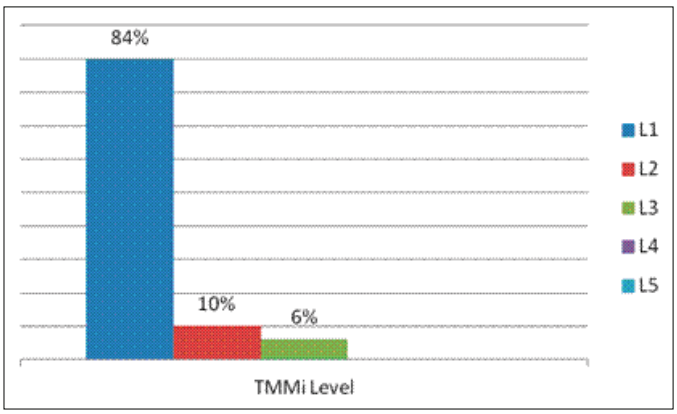


Figure 3: Maturity of the organizations.

Thus, today most of the organizations are still at TMMi maturity level 1. Of course, many differences in maturity can be observed within level 1 organizations. In some organizations, testing is highly chaotic with no defined process, while others are almost at TMMi maturity level 2. Even at level 1 a test project can be successful. However, this is achieved by the dedication and effort of the 'test heroes', not by means of a managed and repeatable test process.

TMMi maturity level 2

Organizations at TMMi maturity level 2 can be perceived as being in the testing "premier league". They are still a rare breed. The main objective of testing in a TMMi level 2 organization is to verify that the product satisfies the specified requirements. At TMMi level 2, testing is a managed process. At component level it is clearly separated from debugging and a company-wide or program-wide test strategy is established. Test plans are written which include a concrete test approach based on the result of a product risk assessment. The test plan defines what testing is required, when, how and by whom. Testing is monitored and controlled to ensure it is proceeding according to plan and appropriate actions are taken when deviations from plan occur. Test design techniques are applied to identify and define test cases from requirements. However, testing may still start relatively late in the development lifecycle, e.g. during the design or even at the beginning of the implementation phase.

TMMi maturity level 3

Organizations at TMMi maturity level 3 can be perceived as being in the testing "champions league". At TMMi level 3, testing is no longer confined to a lifecycle phase after implementation. It is fully integrated into the development lifecycle and its associated milestones. Test planning is done at an early stage of the project, e.g. during the requirements phase, and is documented by means of a master test plan. Master test planning builds on the test planning skills and commitments acquired at TMMi level 2. The organization's set of standard test processes, which form the basis for maturity level 3, has been established and improved over time. Both a dedicated test organization and a specific test training program exist, and testing is now perceived as being a profession with career paths. Organizations at TMMi level 3 understand the importance of reviews in developing a quality product. A review program has been implemented, but not yet linked to the dynamic testing process at this level. Test process improvement is fully institutionalized and is one of the test organization's practices.

Process areas

Figure 4 lists the maturity scores per TMMi level 2 process area.

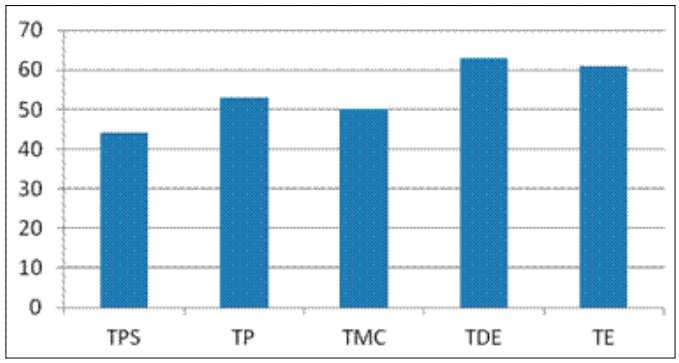


Figure 4: Scores (incl. standard deviation) per TMMi level 2 process area.

One can observe in Figure 4 that the operational testing process areas, Test Design and Execution, and Test Environment, are typically the process areas with the highest maturity scores. The managerial process areas (Test Policy and Strategy, Test Planning, and Test Monitoring and Control) have a large distribution in their maturity score. Although the mean maturity score for these process areas is lower compared with the operational process areas, there are many organizations that have already implemented these process areas quite well. However, there are

also many organizations that have a very low maturity score for these managerial process areas. In these organizations, typically testing is not well integrated and linked to the business drivers and quality policies, and lacks management commitment.

CMMI and TMMi

Practical experiences have shown that TMMi can also be applied successfully in organizations which are not at all familiar with CMMI. However, implementing TMMi is perhaps slightly easier in organizations that are already familiar with CMMI. Analyzing the assessment data, a significantly higher maturity score was observed on especially the managerial TMMi process areas for organizations that are also using CMMI (in blue) compared with those that are not also using CMMI (in red).

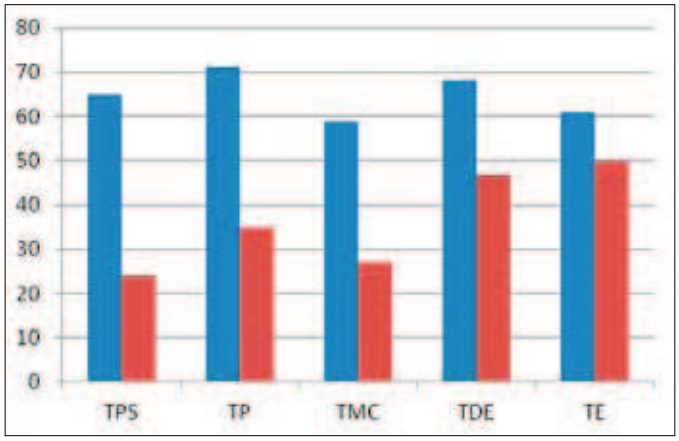


Figure 5: *TMMi maturity score – CMMI organizations vs. non-CMMI organizations.*

The authors believe that the reason for this could be that organizations also using CMMI already have experience in defining, implementing, and using policies, as well as planning and monitoring processes. This probably applies to having experience in any other software improvement model. It is the experience with process improvement in general that is important and helps here, rather than the specific experiences with CMMI.

Sector results

An analysis was also done on the maturity scores per domain. Is testing maturity on average higher in some areas compared with others? Based on the assessed organizations, three areas were distinguished that had enough data points to be analyzed: industrial organizations, financial institutions, and government bodies. From Figure 6 it can be seen that industry (e.g. medical, automotive, embedded software) has a significantly higher maturity score compared with finance and government. The average maturity score for industry is even higher for all TMMi level 2 process areas, but especially for Test Policy and Strategy, and Test Planning.

Probably due to the risk level of the systems being developed, industry is more mature in terms of testing compared with the other areas analyzed.

Test practices

Although it was hard to draw conclusions for specific practices based on the available assessment data, it was observed that some specific practices within the TMMi process areas were much more commonly applied that others. Incident management and test environment control are typically strong practices and fully implemented. However, reliable test estimation,

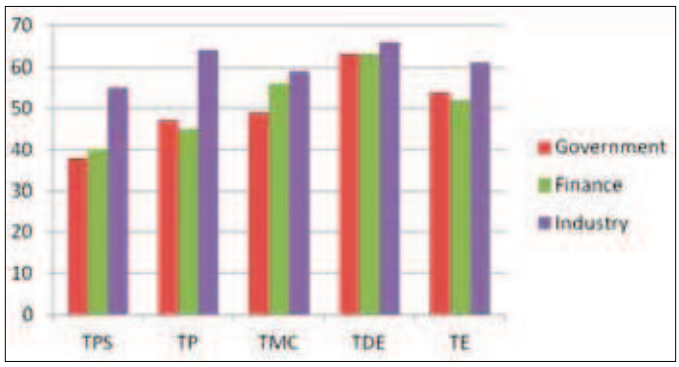


Figure 6: TMMi level 2 maturity scores per area.

the application of test design techniques, and documenting test environment requirements are typical problem areas for many organizations. These observations are much in line with the practical experiences of both authors. Providing a reliable and well-founded test estimate is a problem for most test managers, test design techniques are often not explicitly used, and, in practice, we rarely see requirements for test environments being obtained and specified.

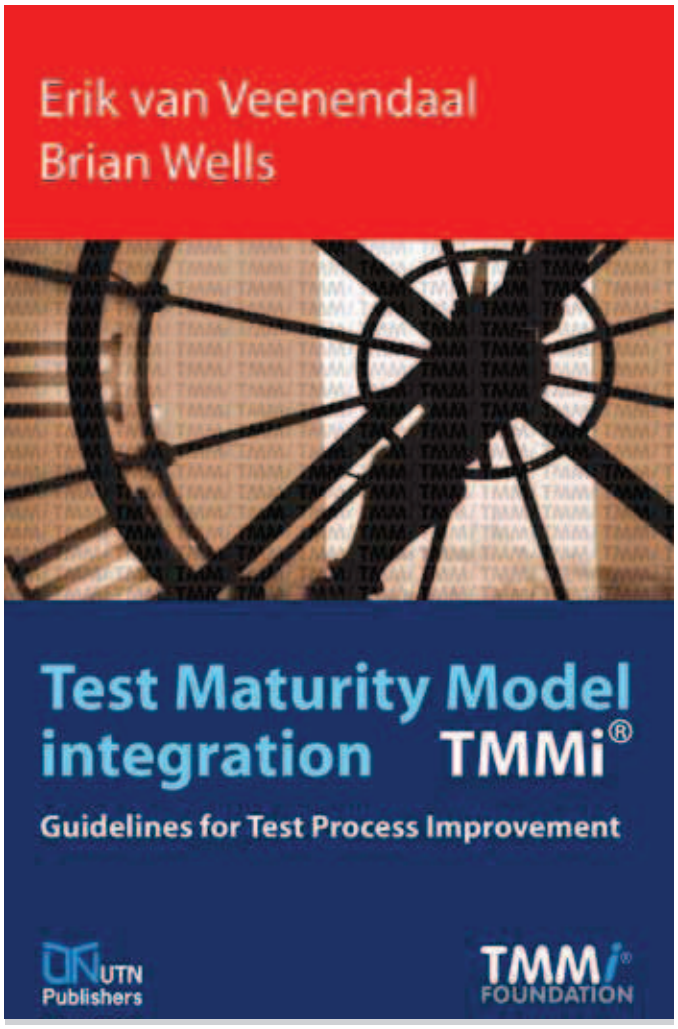
Closing comments

In recent years, much effort has been invested in improving the testing processes. In some organizations this has lead to remarkable results, but not in every organization for many reasons. With TMMi now being fully available, it is expected that it will become even more popular and be used as the standard test maturity framework against which to assess and improve one's test processes. Based on the benchmark results, the testing industry still has many steps to take towards maturity. There is long but rewarding road ahead of us. ■

> about the authors

Erik van Veenendaal (*www.erikvanveenendaal.nl*) is a leading international consultant and trainer, and a widely recognized expert in the area of software testing and quality management with over 20 years of practical testing experience. He is the founder of Improve Quality Services BV (*www.improveqs.nl*). He holds the EuroSTAR record, winning the best tutorial award three times! In 2007 he received the European Testing Excellence Award for his contribution to the testing profession over the years. He has been working as a test manager and consultant in various domains for more than 20 years. He has written numerous papers and a number of books, including "The Testing Practitioner", "ISTQB Foundations of Software Testing" and "The Little TMMi". Erik is also a former part-time senior lecturer at the Eindhoven University of Technology, vice-president of the International Software Testing Qualifications Board (2005–2009) and currently vice chair of the TMMi Foundation.

Jan Jaap Cannegieter is Vice President of SYSQA B.V., an independent Dutch consultancy. Jan Jaap has 20 years of experience in requirements, quality assurance and testing, is author of nine books, including 'The little TMMi'.



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