

Issue 16, Free Digital Edition

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By Drs. ERIK VAN VEENENDAAL, Bonaire

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Erik van Veenendaal (www.erikvanveenendaal.nl) is a leading international consultant and trainer from Improve IT Services BV (Bonaire), and a recognized expert in the area of software testing, quality and requirement engineering. He is the author of a number of books and papers within the profession, one of the core developers of the TMap testing methodology and the TMMi test improvement model, and currently the CEO of the TMMi Foundation. Erik is a frequent keynote and tutorial speaker at international testing and quality conferences. For his major contribution to the field of testing, Erik received the European Testing Excellence Award and the ISTQB International Testing Excellence Award.

The TMMi Foundation has just published its 2nd world-wide user survey. Almost 100 organizations (TMMi users) contributed to the survey. In this paper some of the outcomes, especially around costs and benefits associated with TMMi, are presented and discussed. Looking at the people aspect of test process improvement, the role and importance of ISTQB for the TMMi initiative is also briefly addressed based on the survey results.

THE TMMI MODEL

The Test Maturity Model integration (TMMi) [1] is a framework for test process improvement that uses the concept of maturity levels for process evaluation and improvement. Furthermore, for each maturity level, a set of process areas, goals, and practices are identified (figure 1). TMMi is aligned with international testing standards, syllabi, and terminology of the International Software Testing Qualifications Board (ISTQB), which has certified over 850.000 test professionals (June, 2023). With TMMi, organizations can have their test processes objectively evaluated by accredited assessors and improve their test processes. TMMi has a "staged" scheme for test process assessment and improvement. It contains stages or levels through which an organization passes as its testing process evolves from one that is ad-hoc, also called "initial" (level 1) to one that is managed, defined, measured, and optimized (level 5). Today, TMMi is the world-leading model for test process improvement (confirmed by IEEE study [2]).

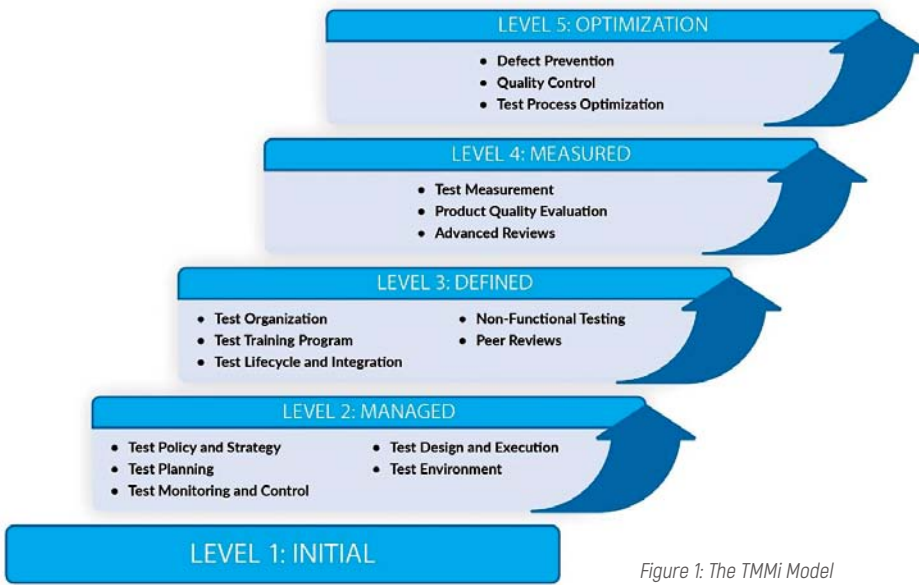


Figure 1: The TMMi Model

2ND TMMi WORLD-WIDE USER SURVEY

From January 2022 to February 2023, the TMMi Foundation performed its 2nd world-wide user survey. All organizations assessed in either 2021 or 2022 were invited to contribute based on their practical experiences using TMMi. The survey was performed to establish a recent and up-to-date view of the costs and benefits associated with the TMMi, reasons for adopting TMMi but also challenges encountered applying TMMi. Almost 100 organizations contributed to the survey, representing a high 79% of organizations invited to participate. The response rate and population size imply a confidence level of 95% that the real value is within ±5% of the measured value. The combination of knowledgeable persons from within TMMi assessed organizations contributing and a high confidence level make the results of the survey a reliable source for understanding how TMMi is performing in the market.

TMMi BENEFITS

Figure 2 shows the respondents' top 10 TMMi benefits. Enhancing software quality, increasing testing productivity, and reducing product risk were mentioned amongst the top four benefits, which essentially form the project management's "golden triangle". This indicates, in line with the results of the 1st TMMi world-wide user survey better management of testing is an important benefit for TMMi [3]. Furthermore, achieving TMMi certification is a key benefit for adopting TMMi, which indicates the importance of certification amongst TMMi users and their business operations. Good test engineering practices like standardized compliance and improved test engineering discipline are also relatively high on the list of TMMi benefits.

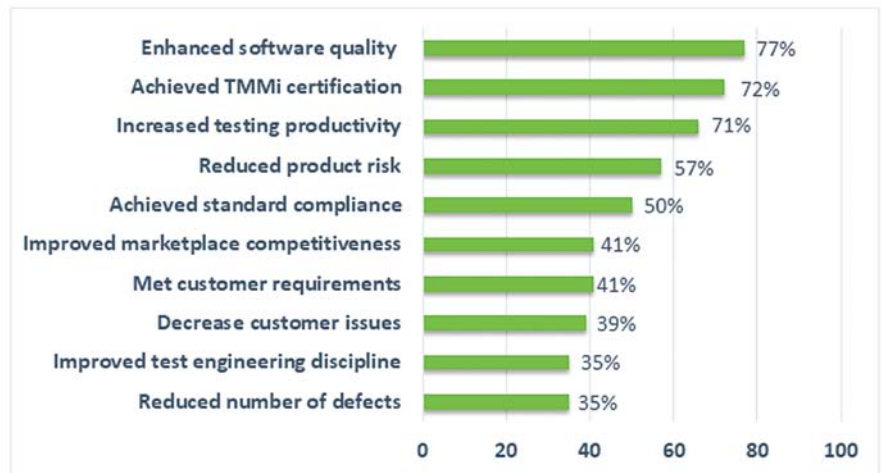
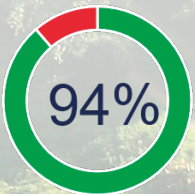
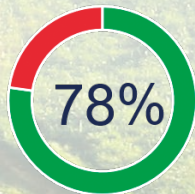


Figure 2: Benefits of Adopting TMMi

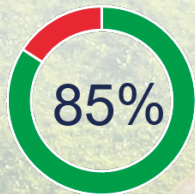
Product Quality



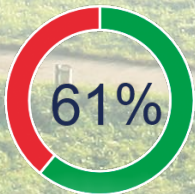
Test Efficiency



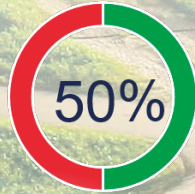
Compliance



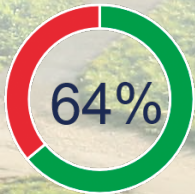
People



Test Predictability



Business Alignment



The list of benefits from the survey was designed such that they can be categorized under six headings: product quality, test efficiency, compliance, people, test predictability, and business alignment. For example, enhanced software quality and reduced product risk both contribute to product quality, increased testing productivity contributes to test efficiency, and an improved test engineering discipline contributes to the people aspect. Changing the view from the individual benefits to the categorized one, provides the outcome shown in figure 3.

Figure 3: Categorized Benefits of Adopting TMMi

A high 94% of the TMMi users are observing benefits for product quality (e.g., reduced product risks and/or decreased customer issues). Benefits are also commonly observed in terms of test efficiency (78%), compliance (85%). Interestingly business alignment (e.g., improved market competitiveness and/or improved financial performance) shows a much higher score than with the 1st TMMi world-wide user survey (39%) [4]. From the survey results, we can observe that business alignment is also higher in the motivation list (reasons for adopting TMMi). It seems that achieving business alignment (and value) today, is more in focus with TMMi users. Also test predictability now achieves a higher score (up from 38% to 50%). This may be due to more companies achieving higher TMMi levels. Practices at higher TMMi levels, e.g., measurement (at level 4) and quality control (at level 5), are often needed to achieve test predictability.

TMMI ASSOCIATED COSTS

Of course the benefits as described above do not come for free. There are costs associated with the implementation of TMMi and test process improvement. Executing a TMMi-based improvement program requires an investment. When speaking about costs associated with TMMi usually a distinction is made between direct and indirect costs and benefits. Direct costs and benefits can directly be allocated to the improvement program and can quite easily be expressed in terms of money. Examples of direct costs are effort (work hours), training and education, marketing and external consultancy (e.g., assessment cost). Indirect costs cannot directly be allocated to the improvement program or are more difficult to express in terms of money. Examples of indirect costs are the learning curve and productivity loss because of opposition to the process changes. Figure 4 shows the percentage of test effort that the respondents stated to have spent on test process improvement. At a quick glance something like 5% of the total test effort is probably a value to take as an initial starting point.

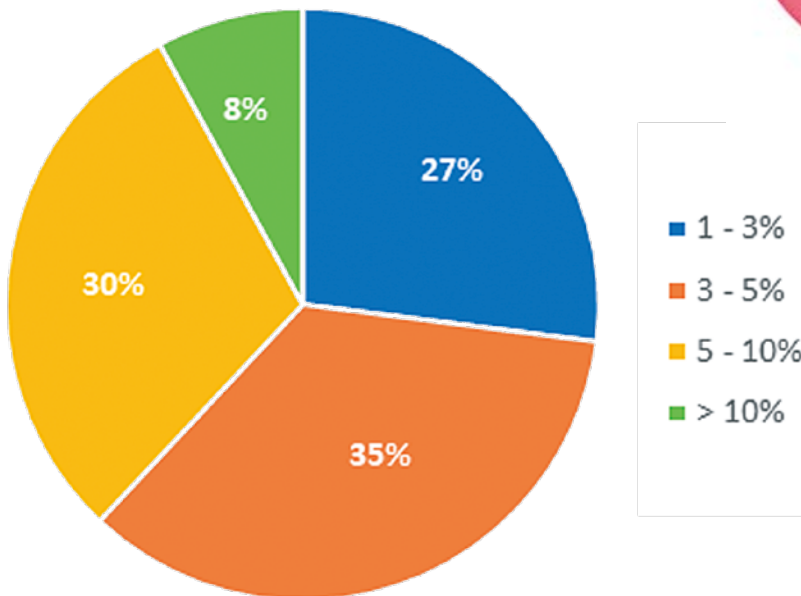


Figure 4: Percentage of the Total Test Effort spent on Test Process Improvement

PEOPLE: ISTQB

A highly popular framework in the business domain is the People, Process, Technology framework (also known as the PPT framework) [5]. It refers to and exhibits how the balance of people, processes, and technologies drive successful organizational change, improvements and re-engineering (see figure 5). The PPT framework considers people to be the most crucial part of the triangle. People refers to the employees within the organization. They are the ones who complete the process tasks, sometimes supported or leveraged by technology. Employing and hiring the right people is essential. An organization needs to identify which skills, experience, attitude, and values are required for their employees. Bringing this back to testing, test process improvement and TMMi implementation, we can very easily state that the International Software Testing Qualifications Board (ISTQB) scheme and portfolio can be an essential part for complying with the people aspect for testers.

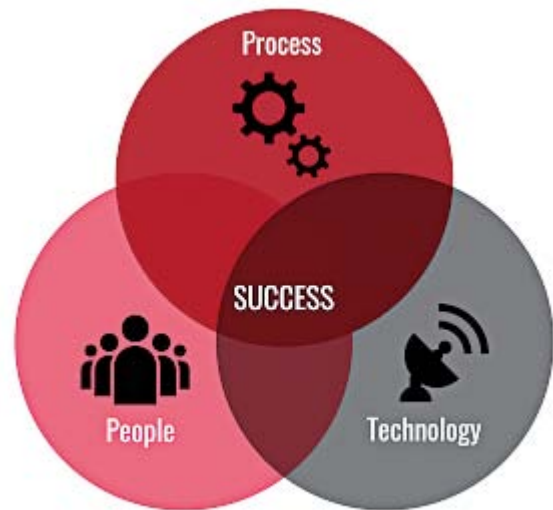


Figure 5: The PPT Framework, three pillars for success

As we can observe from figure 6, a high 82% of the TMMi users use the ISTQB certification scheme to train their staff and build testing knowledge and skills, thereby making ISTQB an important scheme to consider for TMMi (and possibly also vice versa). However, only a mere 13% use ISTQB also to train other workforce than testers. With Agile statements like “quality is the responsibility of the team” and “Everyone is a tester”, we would expect this percentage to be much higher. ISTQB is apparently less popular outside testing and/or does not address their needs. The percentage of TMMi users not using the ISTQB scheme to train their staff on testing is 18%. This is a higher percentage compared to the 2021 TMMi user survey when this was only 13% [4].

Finally, within the survey important advice is shared by the respondents to take into account when planning to conduct TMMi-based test process improvement. Interestingly focusing on better test professionals in parallel (47%) has a substantial higher score than focusing on

test automation in parallel (23%). In line with the PPT framework, TMMi users consider people to be a very important part of the triangle driving change and improvements.

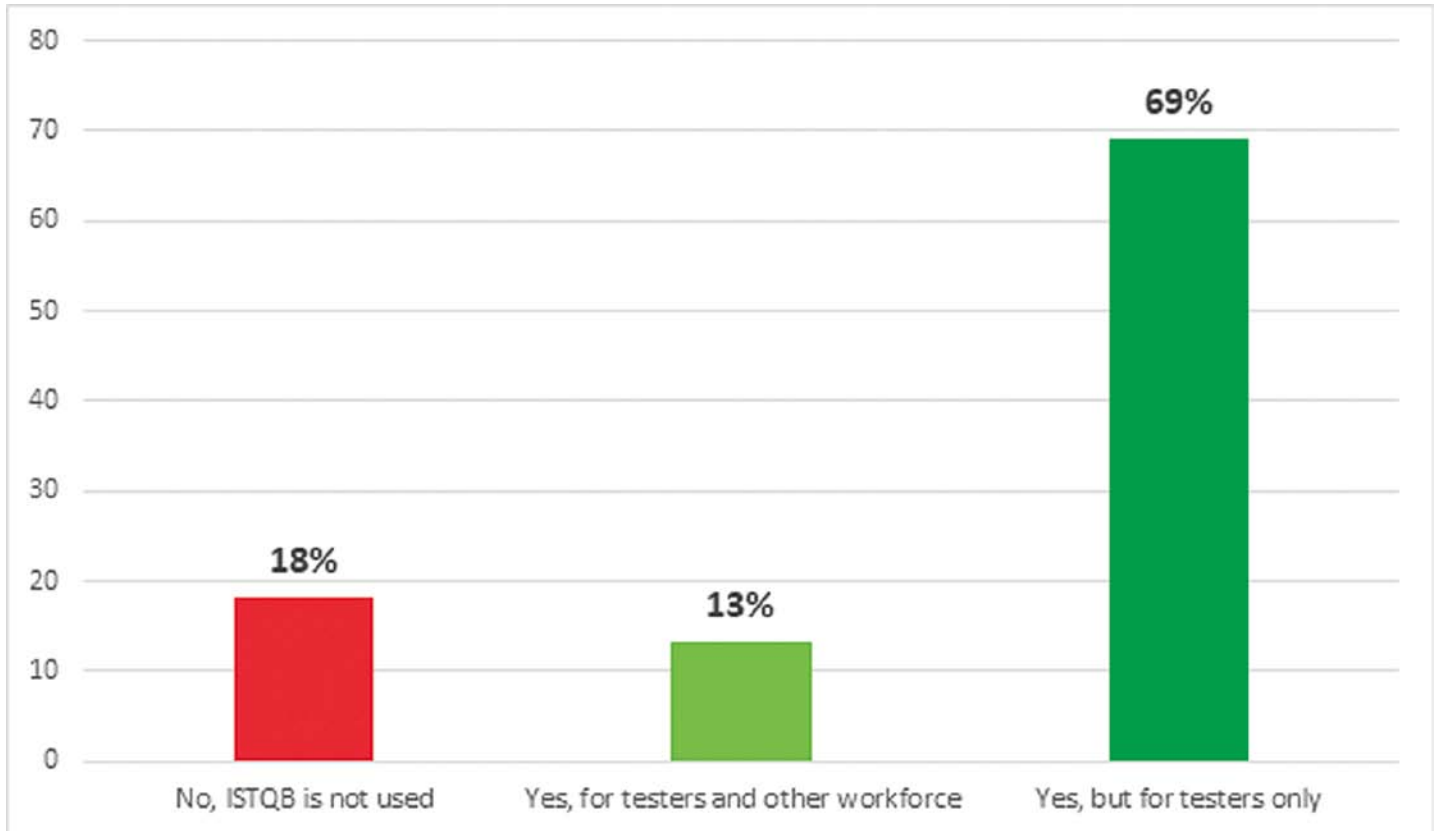


Figure 6: ISTQB portfolio used to train and certify engineers

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