发起人高层会议总结报告

RAGHAV S. NANDYAL
SITARA TECHNOLOGIES PVT. LTD.

Dear Raghav Nandyal:

一、总体发现

在本次 CMMI 高级成熟度评估中，主任评估师、翻译老师和 6 位 ATM 辛勤工作，举行了多场访谈和文档审查，通过他们丰富的经验和专业的技能，系统地了解了我们公司的 CMMI 成熟度水平，帮助我们对业务流程进行全面复盘，从上次 CMMI 认证的评估标准 V1.3 迭代至现在 V2.0，我们重新制定量化了公司的考核标准，整个认证流程的规范为我公司运营中的决策指导提供了重要思路，并在评估结束后，提供了宝贵的建议和改进建议，以便我们进一步提高运营和管理水平。本次评估总共发现了 25 项改进建议。改进建议分为工程管理、项目管理、支持管理、过程管理 4 类，其中，工程管理 5 条，项目管理 6 条，支持 9 条，过程管理 5 条。经过公司高层经理、EPG 过程改进小组、项目经理、QA、CM、OT 等过程改进中的重要角色研究讨论，一致认为发现改进项与公司的实际情况高度符合，符合度为 100%。

二、经验教训

我们从工程管理、项目管理、支持、过程管理四个方面分别进行总结。

工程管理

在项目测试方面：要更加关注对验收阶段与测试阶段发现缺陷的比对分析。通过对比分析，关注缺陷变化，缺陷率变化，可以反映出人员方式方法和人员能力的

水平。比如，梳理是否有的问题曾经出现过，是否有没有发现的问题。如是曾经出现过的问题再次发生，或者出现没有发现过的问题，则需要与需求、开发、测试人员共同复盘分析是哪个过程环节有所疏漏，是由于工作方法的问题、人员能力问题、经验问题或是态度问题，充分剖析问题有利于积累经验和能力提升。比如，关注缺陷率的变化，验收阶段比测试阶段下降非常多，说明测试分析，问题定位以及开发整改的方法和质量较高，入缺陷率下降不多，或有所增加，说明开发问题较多，或者测试对问题的分析定位不准确，则要关注方式方法和人员能力的培训。

在正式交付前开展客户试用，进一步发现需求范围内的细节问题，以及检验系统在实际情况下的缺陷率。客户的测试关注点和使用习惯与测试人员及开发人员可能不同，通过这个过程，可以更多的客户使用方面的暴露问题，开发人员和测试人员会更加换位思考，从客户的使用方便性、界面简洁美观、系统的易用性方面有更好的理解，在后续的开发测试中，开发人员在关注基本功能可用的基础上，更加关注客户感受，提高开发测试效率和能力。

在项目需求方面：会在后续项目中，尽可能为每一个功能编写场景流程图，以便于相关干系人可以理解开发需求的场景，加强审核，将原型图与功能需求进行一一对应，核查有无遗漏。

项目管理

在制定项目计划文件前，要与人力部门提前沟通，提前规划好项目需要的人员技能要求；制定培训内容前要提前做好问卷调查，已了解被培训人的技能水平，制定相匹配的培训内容，已更好的胜任岗位要求。

现在项目估算时缺乏一些量化的指标，都是一些主观的定义，尤其是对复制需求估算时。我们考虑在后续估算模型中增加一些可以量化的指标，如在需求、设计

阶段估算时，增加文档页数的量化指标；在开发阶段估算时，增加代码行的量化指标；在测试阶段估算时，增加测试用例数量的量化指标。并且将评价标准范围按数值 1-10 来进行评价，确保评价内容的颗粒度更小，估算值更精准。

在项目监控中记录中增加问题的解决方案、问题影响的范围、问题解决的责任人、问题整改审核人，使之责任到人，并在每次晨会、周例会上要对问题跟踪一栏表中的问题点进行及时跟踪，及时保障问题的有效解决。

支持

根据评估老师的建议，我们发现我们目前使用的模型比较单一。目前我们在组织级的工作量偏差方面提供的数据模型，在实际的使用中对工作量的预测相对来不是很准确。基于老师的建议，我们会组织 EPG 小组成员及相关工程领域的资深人员对我们的研发流程进行深入的分析，综合考虑相关过程和数据建立更切合我们的模型。并在相关项目中进行试点，检验试点效果，再做分析，如果符合预期，在组织内部进行推广。具体过程如下：

1、整理分析目前的模型和工作量偏差的数据，收集汇总目前的数据。

2、收集、汇总相关可用模型，会议讨论模型的可用性，结合自身的研发流程，选择合适的模型进行试点。

3、验证模型的有效性，确定模型是否适合推广，如果适合推广，在组织内部进行普遍使用。

4、定期总结分析模型的有效性，进行实时的调整优化。

过程管理

我们会采纳评估老师的建议，全面整理资产库中对于复用部分的标准内容，充

实复用库的内容。对资产库中的复用方式和复用层次进行明确，明确是属于代码复用还是业务复用，业务复用的话是业务实体复用针对细分的业务领域，业务流程的复用针对的是业务场景。从代码复用到业务复用，越往上，复用程度越高，复用产生的价值也越大，但实现起来也越复杂，它能复用的场景就越有限。在后续的实际工作中，代码层面上的复用相对比较简单，我们对这部分的认知也最多，而且由于开源的普及，现在有丰富的中间件可供我们选择，我们可以基于这些，逐步构建适合我们公司的技术体系。更进一步整理业务中间件，并在此基础上，形成相关的业务平台，这样，我们就能实现更高的业务级复用，可以更高效地支持系统的快速落地，让相关中间件产生最大的价值，提升公司的研发能力和效率。

三、现实意义

1）在项目中使用高成熟度实践，可以提高软件开发和维护的质量，降低软件开发和维护的成本，通过组织级的统计分析数据，进行了项目的工作量、周期、成本等的估算，降低了项目的实施周期和成本。并且对在需求评审阶段发现缺陷及内部测试阶段和验收测试阶段发现的缺陷数据进行了相关分析，发现系统功能性测试覆盖不足、测试轮次较少导致的缺陷密度较高。我们通过相关的改进措施，有效降低了测试的缺陷密度，保证了质量，提升了客户满意度。

2）在组织层面使用高成熟度模型，通过红星矩阵工具进行目标分解，最后关键改进过程落实到需求生产率和编码生产上面。在编码生产率方面，我们通过敏感度分析和相关的根因分析，发现在编码阶段代码复用率比较低和编码管理规范不规范。我们通过收集到的数据进行相关分析，跟踪过程，并开展相关能力经验分析的培训，提高了组织正产率。

3）在组织层面通过高成熟度进行系统的学习和讨论，使得我们对组织标准过程体系有了更深入的了解，EPG 给项目提供了相关的性能基线和性能模型，并且通过使用 minitab、水晶球等相关量化统计分析工具来判断过程是否稳定，确认组织过程改进能否达到预定的目标。

综上所述，评估可以帮助组织提高软件开发和维护的质量，降低成本，促进组织合作沟通，提升组织管理能力，提高组织的信誉度和竞争力，并改善客户满意度和信赖度，具有非常实际的意义。

四、改进措施

首先，EPG 小组会将本次评估中发现的弱项、问题、建议等，汇总形成《过程改进建议表》并在 EPG 会议上分析讨论和评审确定，然后向 发起人汇报，确定改进的优先级及责任人，制定和跟进执行具体的《过程改进计划》。此外，涉及到需要调整的标准过程文件和模板，我们会在下次 EPG 会议上进行评审并发布，同步配置更新到相应的过程资产库中。

其次，针对《过程改进计划》制定我们详细的的活动步骤、试点计划、推广方案等， 发起人组织高层经理、EPG 成员进行研讨改进实施注意事项及潜在障碍和可能风险，向组织申请专项过程改进资金、培训等支持。改进实施过程中，相关人员需要选用恰当的契机先做改进试点，试点反馈有效再逐步复制推广。

最后，EPG 小组会对整个改进过程进行全流程监控，帮助组织专注于关键的改进项目，对改进效果进行度量和量化分析，以便识别改进领域。在此同时，按需对团队进行培训和辅导，使用最佳实践协助提升团队素质，实现更高的质量和更高的业务成功率，不断提升公司的整体竞争力来实现商业目标。

经过此次 CMMI 评估的顺利进行，是我公司在软件领域的又一次成功突破，显示了公司不仅可以通过信息化、数字化的方式对项目进行管理，还可以充分利用这些信息，主动地改善流程，利用新技术对流程进行优化，预防企业在项目实施过程中可能出现的问题，为公司软件开发实力提供了更权威性的资质背书，将进一步提升客户信任度与认可度，为公司在更广阔的市场拓展中起到积极的推动作用。

我在此授权并同意 SITARA Technologies 在 SITARA 的出版渠道上分享我们的评估成果，在 SITARA Technologies 认为合适的情况下宣传我们的评估成果。

北京移动系统集成有限公司

发起人：王辉

2023 年 7 月 1 日

EXECUTIVE SESSION BRIEFING - SPONSOR FEEDBACK

RAGHAV S. NANDYAL
SITARA TECHNOLOGIES PVT. LTD.

Dear Raghav Nandyal:

Overall Findings:

In the high maturity appraisal of CMMI, the Lead Appraiser, Registered Interpreter, and 6 ATM members worked diligently. They conducted multiple interviews and document reviews, leveraging their extensive experience and professional skills to systematically understand our company's CMMI maturity level. This helped us conduct a comprehensive retrospective analysis of our business processes. From the previous CMMI certification appraisal based on version 1.3 to the current version 2.0, we have redefined and quantified our company's assessment criteria. The standardized certification process provided important guidance for decision-making in our company's operations. After the appraisal concluded, valuable suggestions and improvement recommendations were provided, enabling us to further enhance our operational and management capabilities. A total of 25 improvement recommendations were identified in this appraisal. The improvement recommendations are categorized into four areas: Engineering Management (5 recommendations), Project Management (6 recommendations), Support Management (9 recommendations), and Process Management (5 recommendations). After thorough discussions and research involving senior managers, the EPG process improvement group, project managers, QA, CM, OT, and other key roles in the process improvement initiative, it was unanimously agreed that the identified improvement recommendations are highly aligned with our company's actual situation, achieving a 100% alignment rate.

Lesson Learned:

From the perspective of engineering management, project management, support, and process management, we conducted a summary.

Engineering Management:

In the area of project testing, it is essential to place increased emphasis on the comparative analysis between defects identified during the acceptance phase and those discovered during the testing phase. Through comparative analysis, attention should be given to changes in defects and defect rates, which reflect the level of personnel methods, capabilities, and approaches. For instance, it is important to examine whether previously encountered issues have resurfaced or if there are any undiscovered problems. If recurrent issues arise or new, previously unidentified issues emerge, it necessitates a collaborative retrospective analysis among the requirements, development, and testing personnel to identify process gaps and oversights, whether attributable to work methods, personnel capabilities, experience, or attitude. A comprehensive analysis of these issues facilitates knowledge accumulation and capability enhancement.

Additionally, it is crucial to monitor the change in defect rates. A substantial decrease in defect rates during the acceptance phase compared to the testing phase indicates high-quality testing analysis, issue localization, and development rectification methods. Conversely, if the decrease in defect rates is minimal or if there is an increase, it suggests an increased prevalence of development-related issues or inaccuracies in issue analysis and localization by the testing team. In such cases, attention should be directed towards training personnel in methods, approaches, and capabilities.

Prior to formal delivery, conducting customer trials enables the identification of detailed issues within the scope of requirements and evaluates the system's defect rate in real-world scenarios. Customer testing focuses and usage habits may differ from those of the testing and development personnel. This process provides greater exposure to customer-related issues, prompting developers and testers to adopt a customer-oriented mindset, understanding usability, interface aesthetics, and system user-friendliness. Subsequently, in the development and testing phases, developers prioritize customer experience while ensuring fundamental functionality, thereby improving development and testing efficiency and capabilities.

In terms of project requirements, in subsequent projects, efforts will be made to create scenario flowcharts for each functionality, aiming to facilitate the understanding of development requirements by relevant stakeholders. This practice strengthens the review process by aligning prototype diagrams with functional requirements, ensuring a thorough check for any omissions.

Project management

Before creating the project plan document, it is important to communicate with the HR department to plan and identify the required skills of the project personnel in advance. Prior to designing the training content, conducting a questionnaire survey is recommended to assess the skill levels of the trainees. This helps in developing training content that aligns with their skills, enabling them to better meet the job requirements.

Currently, there is a lack of quantitative metrics in project estimation, with subjective definitions being used, especially when estimating replicated requirements. To address this, it is proposed to incorporate quantifiable indicators into the estimation model in subsequent iterations. For example, when estimating during the requirements and design phases, a quantitative measure such as the number of document pages can be added. Similarly, during the development phase, a measure such as the number of lines of code can be included, and during the testing phase, the quantity of test cases can be considered. Additionally, introducing a numerical evaluation scale ranging from 1 to 10 for assessing the evaluation criteria ensures finer granularity of evaluation content and more precise estimation values.

In project monitoring, it is beneficial to include the solution to each recorded problem, the scope of problem impact, the person responsible for resolving the problem, and the person responsible for reviewing the problem resolution. This ensures accountability for problem resolution. Additionally, during daily stand-up meetings and weekly team meetings, it is important to proactively track and address the identified issues in the problem tracking section, ensuring timely and effective resolution of problems.

Support

According to the appraiser's recommendations, we have identified that the model we currently use is relatively limited. The data model we provide for organizational-level effort deviation does not accurately predict workload in practical usage. Based on the appraiser's suggestions, we will organize the EPG team members and experienced professionals in the relevant engineering field to conduct a thorough analysis of our development process. This analysis will consider the relevant processes and data to establish a more suitable model for our needs. We will then pilot test this model in relevant projects to evaluate its effectiveness. Upon analyzing the results and confirming their alignment with expectations, we will promote the model within the organization. The specific process is as follows:

Organize and analyze the current model and data on effort deviation, collecting and summarizing the existing data.

Gather and summarize available models, hold meetings to discuss the usability of these models, and select the most suitable model based on our own development process for pilot testing.

Validate the effectiveness of the model and determine its suitability for wider adoption. If it proves to be suitable, promote its use throughout the organization.

Regularly summarize and analyze the effectiveness of the model, making real-time adjustments and optimizations as needed.

Process Management

We will adopt the appraiser's recommendations and comprehensively organize the standardized content for reusable components in the asset repository, enriching the content of the reuse library. We will clarify the reuse methods and levels in the asset

repository, distinguishing between code reuse and business reuse. For business reuse, it can be further categorized into business entity reuse, which targets specific business domains, and business process reuse, which focuses on business scenarios. As we move from code reuse to business reuse, the level of reuse increases, and the value generated from reuse also grows. However, implementation becomes more complex, and the scenarios in which it can be applied become more limited.

In our subsequent work, code-level reuse is relatively simple, and our understanding of this aspect is also more extensive. Additionally, with the popularity of open source, we now have a rich selection of middleware options available. We can gradually build a technical ecosystem suitable for our company based on these options. Furthermore, we will further organize business middleware and use it as a foundation to establish relevant business platforms. This will enable us to achieve higher-level business-level reuse and efficiently support rapid system deployment, allowing the related middleware to generate maximum value and enhance our company's development capabilities and efficiency.

Relevance

By implementing high maturity practices in the project, we can enhance the quality of software development and maintenance while reducing costs. Through organizational-level statistical analysis, we conducted estimations of project effort, duration, and costs, leading to decreased implementation time and costs. Furthermore, we analyzed the defect data identified during requirements reviews, internal testing, and acceptance testing. This analysis revealed insufficient coverage in system functionality testing and higher defect density due to fewer testing cycles. Through relevant improvement measures, we effectively reduced defect density in testing, ensuring quality and improving customer satisfaction.

At the organizational level, employing high maturity models allowed us to decompose goals using the Red Star Matrix tool, ultimately implementing key improvement processes in requirements and code productivity. Regarding code productivity, sensitivity analysis and root cause analysis revealed low code reuse rates and non-standard code management during the coding phase. We conducted data analysis and process tracking, and provided training on capability and experience analysis, resulting in improved organizational productivity.

Through high maturity practices at the organizational level, we engaged in systematic learning and discussions, gaining a deeper understanding of the organizational standard process framework. The EPG provided performance baselines and models for projects. We utilized quantitative statistical analysis tools such as Minitab and Crystal Ball to assess process stability and determine if organizational process improvements met predefined goals.

In conclusion, assessments can help organizations improve the quality and cost-effectiveness of software development and maintenance. They promote collaboration, enhance organizational management capabilities, and improve credibility and competitiveness. Additionally, assessments contribute to enhancing customer satisfaction, trust, and loyalty, making them highly valuable in practical terms.

Improvement measures

Firstly, the EPG team will consolidate the weaknesses, issues, and suggestions identified in this assessment and create a "Process Improvement Recommendations" document. This document will be analyzed, discussed, and reviewed in the EPG meeting. The findings will be reported to the project sponsor, and the priorities and responsible individuals for the improvements will be determined. A specific "Process Improvement Plan" will be formulated and monitored for execution. If there are any adjustments required for standard process documents and templates, they will be reviewed and released in the next EPG meeting, and the corresponding process asset repository will be updated accordingly.

Secondly, for the "Process Improvement Plan," we will develop detailed activity steps, pilot plans, and promotion strategies. The project sponsor will organize discussions among senior managers and EPG members to address implementation considerations, potential obstacles, and risks. Support for the process improvement, such as funding and training, will be requested from the organization. During the implementation, relevant personnel will initiate improvement pilots at appropriate opportunities. The effectiveness of the pilots will be assessed, and if successful, the improvements will be gradually replicated and promoted.

Lastly, the EPG team will monitor the entire improvement process, assisting the organization in focusing on key improvement projects and measuring and quantifying the improvement effects to identify further improvement areas. Additionally, training and coaching will be provided to teams as needed, utilizing best practices to enhance team capabilities and achieve higher quality and business success rates. These efforts aim to continuously enhance the overall competitiveness of the company and achieve its business objectives.

The successful completion of this CMMI assessment signifies another breakthrough for our company in the software domain. It demonstrates that the company not only manages projects through information and digitization but also actively improves processes, optimizes them with new technologies, and prevents potential issues during project implementation. This endorsement of our software development capabilities with more authoritative qualifications will further enhance customer trust and recognition, playing a proactive role in expanding our presence in a broader market.

I hereby authorize and give consent to SITARA Technologies to share our appraisal accomplishments on SITARA's publishing channels, giving publicity to our appraisal accomplishment as SITARA Technologies deems it fit.

Beijing Mobile System Integration Co., Ltd.

Wang Hui (Sponsor)

July 1st, 2023