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Towards Implementation of Process and Product Quality Assurance Process Area for Saudi Arabian Small and Medium Sized Software Development Organizations

ISMAIL KESHTA^{ID}, MAHMOOD NIAZI^{ID}, AND MOHAMMAD ALSHAYEB^{ID}

Department of Information and Computer Science, King Fahd University of Petroleum and Minerals, Dhahran 31261, Saudi Arabia

Corresponding author: Ismail Keshta (g237697@hotmail.com)

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ABSTRACT There is a significant need to give more careful consideration to the process and product quality assurance (PPQA) process area of the capability maturity model integration (CMMI) Level 2, especially in the context of small- and medium-sized software development organizations, to help such organizations achieve CMMI Level 2. The objective of this paper is to report the implementation of the PPQA process area for small- and medium-sized software development organizations in Saudi Arabia. An abstract-level model for each specific practice of the PPQA process area has been developed. In addition, an initial evaluation of the proposed models has been discussed. Data have been collected by exploring published research articles and high-level software process descriptions. Moreover, previous research works that dealt with the implementation of CMMI Level 2 process areas have been reviewed. Furthermore, research articles that provide guidance to software development organizations for implementing the process areas of CMMI Level 2 in their environments have been considered. The evaluation of the proposed models was also carried out using an expert panel review process and one case study. After careful analysis of the collected data, we have proposed a model for each specific practice in the PPQA process area. Each model is divided into core stages, and different activities associated with each stage are clearly indicated. Based on the evaluation, we are confident that our proposed models are clear, easy to use and learn, and can be applied to small- and medium-sized software development organizations in Saudi Arabia. In addition, the evaluation results show that the proposed models can help such organizations in implementing the PPQA process area according to the CMMI Level 2 maturity requirement.

INDEX TERMS Software process improvement (SPI), capability maturity model integration (CMMI), small- and medium-sized software development organizations, quality assurance.