Special issue on software and service improvement in the scope of SMEs

Ricardo Colomo-Palacios[1] · Miklós Biró[2] · Richard Messnarz[3]

According to the Organization for Economic Co-operation and Development (OECD) Reviews of Regional Innovation (2011), small and medium-sized enterprises (SMEs) are a main source of employment and economic growth in OECD member countries. SMEs are the dominant form of business organization, accounting, on average, for between 95 % and 99 % of all enterprises. However, in spite of their importance, it is clear from studies and surveys conducted in the literature that the majority of International Standards do not address the needs of SMEs in the field of software development and IT service management.

Recent efforts, such as the ISO/IEC 29110 Software engineering Lifecycle profiles for Very Small Entities standard, are aimed at bringing Software Engineering and Project Management good practices closer to SMEs. However, the practical and real influence of such initiatives in the software and service improvement scenario is still unclear. Following previous editorial efforts in software improvement scenarios devoted to aspects like standards (Colomo-Palacios et al. 2013), industrial experiences (Biró et al. 2014) or innovation (Colomo-Palacios et al. 2012), the aim of this special section is to give an overview of success cases as well as methods and standards to enable systems, software and service process improvement in organizations worldwide with a special focus on SMEs.

✉ Ricardo Colomo-Palacios
  ricardo.colomo-palacios@hiof.no

  Miklós Biró
  Miklos.Biro@scch.at

  Richard Messnarz
  rmess@iscn.com

[1] Østfold University College, Halden, Norway

[2] Software Competence Center Hagenberg, Hagenberg, Austria

[3] ISCN LTD, Graz, Austria

The first paper in the collection is entitled "A research framework for building SPI proposals in small organizations: the COMPETISOFT experience" and is authored by Francisco J. Pino, Félix García, Mario Piattini and Hanna Oktaba. The paper presents COMPETISOFT, a project which investigated Software Process Improvement (SPI) in the context of Latin American small companies and the methodological framework designed for its implementation in SMEs along with the main conclusions of its implementation. The research strategy combines action research and case study research methods and is designed following sound checklists and methods proved in the broad field of software engineering. The authors present its application in several organizations, achieving encouraging results.

Michael Felderer and Rudolf Ramler, based on multiple case studies, report on the state of risk orientation in the testing processes of SMEs and compare this situation to the situation in large enterprises. In their paper, entitled "Risk orientation in software testing processes of small and medium enterprises: an exploratory and comparative study," the authors discover that a strong business focus, the informality of the applied risk concept, and the usage of risks to reduce testing cost and time are key differences for risk-based testing in SME versus large companies.

The third paper in the special section is entitled "Understanding the gap between software process practices and actual practice in very small companies," and its authors are Mary-Luz Sánchez-Gordón and Rory V. O'Connor. In this work, the authors explore the potential adoption of ISO/IEC 29110 in Ecuadorian SMEs and the current practices they are using to support software processes. The work is based on a grounded theory study. The paper reports that the lack of time and confidence are the reasons behind the scanty adoption of software quality standards among these organizations.

Finally, in the paper entitled "Model-driven development of high-assurance active medical devices," Atif Mashkoor presents the refinement-based model-driven development of a software-controlled safety–critical active medical device responsible for renal replacement therapy. The approach for the development of the device consists of three major steps, namely formal requirements specification, requirements verification and validation. The initiative is of capital importance for SMEs, which traditionally play a significant role in the medical device industry and is joining previous works that encouraged SMEs to use formal paradigms in critical software development.

The papers presented in this special section help us to better understand the current interests and initiatives regarding software and service improvement in the scope of SMEs.

The guest co-editors are also co-organisers of an annual conference EuroSPI (European Systems, Services and Software Process Improvement and Innovation). This event started in 1993 and is aimed to bridge the gap bridge between research and industry to support the implementation of SPI. As a result of this, the community gathers members from both fields in equal proportion. This editorial effort will be disseminated among members and will nurture the EuroSPI community.

Finally, the guest co-editors would like to thank Prof. Rachel Harrison, the Editor-in-Chief of the Software Quality Journal for the opportunity to publish this special section and also Jennifer Malat, for her assistance throughout the editing process. The Special Issue editors would also like to take this opportunity to thank the authors for their papers and the reviewers for their valuable comments and suggestions.

References

Biró, M., Messnarz, R., & Colomo-Palacios, R. (2014). Snapshot of industrial experiences shared at the 20th anniversary EuroSPI conference. *Journal of Software: Evolution and Process, 26*(9), 771–775. doi:10.1002/smr.1677.

Colomo-Palacios, R., Messnarz, R., & Biró, M. (2012). Editorial: European systems and software process improvement and innovation (EuroSPI). *IET Software, 6*(5), 403. doi:10.1049/iet-sen.2012.0141.

Colomo-Palacios, R., Messnarz, R., & Biró, M. (2013). Systems, software and services process improvement. *Computer Standards & Interfaces, 36*(1), 1–2. doi:10.1016/j.csi.2013.08.001.