This special issue dedicated to Advances Towards Software Engineering Quality follows the 5th edition of the International Conference on Research Challenges in Information Science (RCIS) held in 2011. The objective of this conference was to provide an international forum for scientists, researchers, engineers and developers from a wide range of information science areas to exchange ideas and approaches in this evolving field. While presenting research findings and state-of-art solutions, authors were especially invited to share experiences on new research challenges.

For this special issue, we have asked authors of the best papers from RCIS 2011 to provide extended accounts of their work. After a traditional review process of the extended versions, four papers have been selected covering several approaches on software engineering quality. The paper “Exploring the Perceived End-Product Quality in Software-Developing Organizations” by Jussi Kasurinen et al. presents a detailed and well-argued discussion on evaluation methods for software-based systems quality. The presented approach is highlighted by a concrete study based on both quantitative and qualitative analyses. It demonstrates its originality by combining three different approaches, namely surveys, theme-based interviews and workshops. The study has been conducted on a wide panel of organizations working on different domains and of different sizes. The survey aims at collecting data on organizations to gain a perspective on the industry field. Interviews and workshops bring a complementary point of view with considerations of the individual
organizations for eliciting and analyzing quality goals with stakeholders. The paper confirms that quality in software organization is “a complex, interconnected concept fluctuating between the stakeholders”. In addition, authors discuss the validity of the proposed approach for the task to elicit quality factors and its advantage over quantitative methods.

The paper “Constraints: The Heart of Domain and Application Engineering in the Product Lines Engineering Strategy” by Raúl Mazo et al. explores the expressiveness of constraint programming languages in the context of Product Lines specification and automation. The paper presents a very complete framework to consider domain and application products specified under a unique paradigm based on the constraint programming formalism. A significant and convincing amount of information is provided to demonstrate why and how constraint programming can be exploited in the context of multi-view engineering for product lines. The paper provides also an evaluation of the approach through tool implementation, computational scalability and feasibility study.

The paper “Faults and their Relationship to Implemented Patterns, Coupling and Cohesion in Commercial C# Software” by Matt Gatrell and Steve Counsell presents a sound empirical study on the effect on design patterns on fault in software regarding coupling and cohesion. The study relates deep observations made on a C# large commercial software over a long period of development. It reveals very interesting and unexpected findings. The first studied issue concerns the relationship between fault occurrence and the property of classes to be pattern-based or not. Surprisingly, it is proved that pattern-based classes are more fault-prone than others. The paper addresses also issues related to the relative fault propensity of design patterns, the correlation between volumes of code changes, class coupling and cohesion with fault propensity.

The paper “Anticipating Requirements Changes-Using Futurology in Requirements Elicitation” by João Pimentel et al. presents an in-depth reflective discussion on a predicting approach for anticipating changes in requirements that could occur during the software life cycle. Authors propose an innovative solution to extend and adapt the Future Wheels method (Glenn, 1972) to requirements elicitation. Future Wheels starts from inputs like the Requirements Document and possible templates and delivers models and their description. These models are used to elicit new requirements to take possible future changes into account. The process described in the paper involves four activities Plan Futures Wheel, Perform Futures Wheel, Define Direct Consequences, and Analyze Direct Consequences that are detailed in the paper. The feasibility of the proposed approach is shown by a sound demonstration on a case study.

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