



# Quality-Aware Rapid Software Development



## How competitive is your SW (improvement)?

It is all about software (SW) today. Today, an organization's functionality and innovation are increasingly driven by SW. Nowadays, electronics and SW are responsible for over 90% of all innovations in the automotive industry and many industrial companies are becoming SW companies. The efficiency of SW development enables quick reaction to market trends. In this context, companies have realized that SW quality makes the difference and is an essential competitive factor for their success. "Quality is the best business plan<sup>1</sup>". Indeed, a recent report by Capgemini states that the average spending on quality management and testing in IT companies has grown from 18% in 2012 to 35% in 2015, and this proportion of the budget is estimated to increase to 40% by 2018. Hence, it is all about SW quality!

Despite the importance of managing SW quality, it is still common that a company only realizes that they have a quality problem when it is already too late or too expensive to fix it. In the evolution and adaptation of SW, the quality of SW is often neglected due to cost and time constraints, which incurs technical debt. Hence, maintenance costs rise and the development of functionalities takes longer by. This leads to questions such as: Which SW quality problems occur in your company? Is there time to manage SW quality in rapid and continuous SW development? If so, how to do this?

## A SW Quality Workshop

Bearing in mind that relevant quality factors of SW systems should be considered during the SW development process, we propose an integrated workshop for the creation of a measurable quality model, from strategic business goals to quantifiable metrics. The workshop demonstrates a workflow and corresponding

moderation methods that allow using GQM+Strategies™, Quamoco and GQM<sup>2</sup> to build such a quality model and to visualize the findings.

First, GQM+Strategies™ aligns the goals and strategies of an organization across different units through measurement. Besides a clear understanding of what the goals of the organization are, the use of GQM+Strategies™ facilitates communication between different units by creating a common understanding. It helps to show the developers their contribution to the higher-level key performance indicators. Usually, there are enough goals or strategies depending on the product quality. During the workshop, we identify the organizational goals underlying SW quality.

Second, Quamoco solves the problem of traditional SW quality models, which provide either abstract quality characteristics or concrete quality measurements, by integrating both aspects. It provides a generic quality model that needs to be tailored to a company's specific strategic goals. We use ISO/IEC 25010 as the generic model to match the specific quality goals identified during our workshop sessions.

Third, GQM provides an approach for goal-oriented measurement. Starting from the goals, questions are derived. By answering these questions, we define the respective metrics quantifying the goals. GQM thus provides a way to define a metric and interpret it. We demonstrate how to make quality aspects measurable and where to get the data from. In our workshop, we examined how to integrate the model into the SW development process.

## Our Experiences in the Q-Rapids Project

We are conducting this research in the context of the Q-Rapids (Quality-Aware Rapid Software Development)

<sup>1</sup> J. Lasseter (Co-founder of Pixar Animation)

<sup>2</sup> V.R. Basili, G. Caldiera, H.D. Rombach, The Goal Question Metric Approach, in: Encycl. Softw. Eng., Wiley, 1994.



H2020 European research project. The main research question of Q-Rapids is: “How can quality requirements be integrated into a rapid SW development process to significantly increase the productivity of the development team and shorten time to market of SW products and services whilst ensuring appropriate levels of quality?”

We have already performed SW quality workshops with the four industry partners of Q-Rapids. You can follow our latest results in the dissemination section of the [Q-Rapids website](#). We also invite you to attend our “International Workshop on Managing Quality in Agile and Rapid Software Development Processes” (QuASD), co-located with PROFES 2017, to be held in Innsbruck (Austria).



*Figure 1 Attendees to the REFSQ'17 conference.*

## REFSQ'17 Paper Presented

As informed in the previous issue of this newsletter, the vision of Q-Rapids was presented at the REFSQ'17 conference held in Essen (Germany). The project coordinator, Xavier Franch, had the chance to introduce the audience (around 20 attendees both from academia and industry) to the project. There were several questions, e.g. which are the roles involved in which part of the process? How to address heterogeneity (different companies may have different kind of data available, or use different tools even if gathering the same type of data)? It was also a good opportunity to realize how the topics of Q-Rapids are of interest to the community. For instance, Alsaqaf et al.<sup>3</sup> presented a systematic literature review on quality requirements in a large scale distributed agile projects. The preprint version of the

paper is available in the Q-Rapids website and the slides of the presentation can be downloaded from SlideShare.

## The 40-year anniversary of RE

Forty years ago, in January 1977, a seminal special issue of the IEEE Transactions on Software Engineering journal appeared with eight papers on requirements engineering (RE) topics. In retrospect, this issue marks the beginning of RE as a scientific and practical discipline. On the occasion of this anniversary, a 1-week seminar has been held in Kappel am Albis, Switzerland, co-organized by Martin Glinz, Roel Wieringa and Q-Rapids' coordinator, Xavier Franch. This seminar, named RE@40, has brought together some of the most prominent researchers of the area in a friendly atmosphere where hot topics have been discussed in depth. One of the sessions has been dedicated to the current state of the area in the H2020 programme and has been moderated by Xavier Franch. In this session, the Q-Rapids project has been introduced together with other RE-related H2020 projects as OPENREQ and SUPERSEDE. Q-Rapids attracted attention given the interest of many attendees in agile software development and quality requirements. In fact, these two lines of research were mentioned in a fish bowl panel, which aimed at identifying hot topics in the field. At a more practical stand, the seminar was a good opportunity to discuss scientific ideas related to Q-Rapids and, importantly, to find some volunteers for circulating the market survey in their industrial networks. For more information, please check [RE@40 results](#).



*Figure 2 Attendees to the RE@40 anniversary seminar.*

<sup>3</sup> W. Alsaqaf, M. Daneva, R. Wieringa: Quality Requirements in Large-Scale Distributed Agile Projects - A Systematic Literature Review. REFSQ 2017, pp. 219-234.