Pekka Abrahamsson
Nathan Baddoo
Tiziana Margaria
Richard Messnarz (Eds.)

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Software Process Improvement

14th European Conference, EuroSPI 2007
Potsdam, Germany, September 2007
Proceedings

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Preface

This textbook is intended for use by SPI (software process improvement) managers and researchers, quality managers, and experienced project and research managers. The papers constitute the research proceedings of the 14th EuroSPI (European Software Process Improvement, www.eurospi.net) conference in Potsdam, September 26-28, 2007, Germany. Conferences in this series have been held since 1994 in Dublin, 1995 in Vienna (Austria), 1997 in Budapest (Hungary), 1998 in Gothenburg (Sweden), 1999 in Pori (Finland), 2000 in Copenhagen (Denmark), 2001 in Limerick (Ireland), 2002 in Nuremberg (Germany), 2003 in Graz (Austria), 2004 in Trondheim (Norway), 2005 in Budapest (Hungary), and 2006 in Joensuu (Finland). EuroSPI established an experience library (library.eurospi.net) which will be continuously extended over the next few years and will be made available to all attendees. EuroSPI also established an umbrella initiative for establishing a European Qualification Network in which different SPINs and national initiatives join mutually beneficial collaborations (EQN - EU Leonardo a Vinci network project).

With a general assembly during October 15–16, 2007 through EuroSPI partners and networks, in collaboration with the European Union (supported by the EU Leonardo da Vinci Programme), a European certification association has been created for the IT and services sector to offer SPI knowledge and certificates to industry, establishing close knowledge transfer links between research and industry. The biggest value of EuroSPI lies in its function as a European knowledge and experience exchange mechanism for SPI know-how between research institutions and industry.

September 2007 Richard Messnarz

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Software Process Improvement – EuroSPI 2007 Conference

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Abstract. This book constitutes the refereed research proceeding of the 14th European Software Process Improvement Conference, EuroSPI 2007, held in Potsdam, Germany in September 2007. The 18 revised full papers presented were carefully reviewed and selected from 60 submissions. The papers are organized in topical sections on agile methods, software process improvement studies, improvement methods, engineering and development, and quality and knowledge concepts.

1 EuroSPI Overview

EuroSPI is a partnership of large Scandinavian research companies and experience networks (SINTEF, DELTA,STTF), the ASQF as a large German quality association, the American Society for Quality, and ISCN as the co-coordinating partner. EuroSPI collabrates with a large number of SPINs (Software Process Improvement Network) in Europe.

EuroSPI conferences present and discuss results from software process improvement (SPI) projects in industry and research, focusing on the benefits gained and the criteria for success. Leading European universities, research centers, and industry are contributing to and participating in this event. This year's event is the 14th of a series of conferences to which international researchers contribute their lessons learned and share their knowledge as they work towards the next higher level of software management professionalism.

The greatest value of EuroSPI lies in its function as a European knowledge and experience exchange mechanism for Software Process Improvement and Innovation of successful software product and service development. EuroSPI aims at forming an exciting forum where researchers, industrial managers and professionals meet to exchange experiences and ideas and fertilize the grounds for new developments and improvements.

1.1 Board Members

EuroSPI Board Members represent centres or networks of SPI excellence having large experience with SPI. The board members are collaborating with different European SPINS (Software Process Improvement Networks).

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The following six organisations have been members of the conference board in the last 8 years:

ASQ, http://www.asq.org
ASQF, http://www.asqf.de
DELTA, http://www.delta.dk
ISCN, http://www.iscn.com
SINTEF, http://www.sintef.no
STTF, http://www.sttf.fi

1.2 EuroSPI Scientific Programme Committee

EuroSPI established an international committee of selected well known experts in SPI who are willing to be mentioned in the program and to review a set of papers each year. The list below represents the research program committee members. EuroSPI also has a separate industrial program committee responsible for the industry/experience contributions.

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1.3 EuroSPI Scientific Chairs

For EuroSPI 2007 the conference board decided to appoint three research programme committee chairs, Dr. Pekka Abrahamsson, Dr. Nathan Baddoo and Dr. Tiziana Margaria, who all have an outstanding SPI experience record.

All four chairs, the general and the research chairs, have a quite complementary and interesting profile. Dr Messnarz works in close collaboration with Austrian research institutions (universities of applied sciences) and large German automotive companies. Dr. Pekka Abrahamsson is a research professor at VTT (a leading Finnish research centre) with an outstanding SPI experience record in SMEs and large companies in the telecom field. Dr. Nathan Baddoo is a professor at the University of Hertfordshire, UK, and he has published scientific articles about the human factors in SPI and has performed studiers at major European organisations applying motivation techniques in SPI. And finally, Dr. Tiziana Margaria, is a professor at the University of Potsdam and she is a program chair and co-chair in various international conferences concerning electronics and software design. The experience portfolio of the chairs covers different market segments, different sizes of organisations, and different SPI approaches.

This strengthens then fundamental principal of EuroSPI to cover a variety of different markets, experiences, and approaches.

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2 How to Read the Proceedings

Since its beginning in 1994 in Dublin, the EuroSPI initiative outlines that there is not a single silver bullet to solve SPI issues but you need to understand a combination of

different SPI methods and approaches to achieve concrete benefits. Therefore each proceeding covers a variety of different topics and at the conference we discuss potential synergies and combined use of such methods and approaches. This proceeding contains selected research papers for 6 topics each having three research papers:

Section I: Enforcement, alignment, tailoring
Section II: Focus on SME issues
Section III: Improvement analysis and empirical studies
Section IV: New avenues on software process improvement
Section V: Software process improvement methodologies
Section VI: Testing and reliability.

Each of the section will be briefly outlined in the following.

2.1 Research Contents

Section I presents three studies addressing three different use cases of process models and standards in a software organization. Hanssen et al. perform a systematic literature review to find out what is the current state-of-the-art research in introducing and tailoring Rational Unified Process (RUP) in different industrial contexts. They conclude that most of the studies are anecdotal and they actually address the effects of RUP rather than the tailoring aspect. Soto and Münch address the alignment of process standards evolving in parallel to derived process models. They use an actual industrial example to illustrate whether a strongly tailored model can still be aligned with its parent standard and to assess the potential cost of such an alignment. The paper by Biro and Molnár attempts to discover the multifaceted synergies discovered between the ISO/IEC 15408 (Common Criteria) IT Security Evaluation standard, software quality evaluation standards and the Capability Maturity Model Integration (CMMI). They demonstrate the use of their findings by real world case studies.

It is well acknowledged that majority of the software companies globally are quite small in their size and volume. Papers in section II focus on issues dealing with processes of an SME organization. Garcia et al. help SME companies to discover which of their project management practices are executed even if not document. Based on the CMMI standard and a questionnaire study, they also point out issues where these companies should focus their improvements. Chen and Staples argue that it is critical to understand the business and practice needs of SMEs in order to increase the relevance and benefits of software process improvement for SMEs. When studying SMEs they place their analytical focus on practice outcomes. They find that SMEs perceive most value for working on project-related outcomes, and for planning and doing work on product-related outcomes. As an empirical conclusion, Chen and Staples present a framework for categorization of project-related practices for further study about CMMI and other SPI approaches. Savolainen et al. present a practical approach to software process improvement in small organizations. Their approach is validated by a case study in a small software company. Their approach helped the

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company independently implement quite significant improvements for identified problems.

The papers in section III present empirical studies on improving software processes. Cerpa et al. argue that SPI models are difficult to understand because they lack visual representations relating concepts to text. They propose a Systems Modular Analysis (SMA) as a graphical modelling approach to facilitate understanding of SPI models. Based on a real world experiment, authors conclude that SMA significantly improves understanding of the properties and structure of CMM-SW Level 2. Pries-Heje and Krohn find find it problematic that software process improvement work is not organized systematically. They summarize experiences from seven years of improvement work at a company. They show empirically that different types of improvement work requires different ways of organizing. As a pragmatically valid conclusion, Pries-Heje and Krohn propose five ways of organizing for five types of improvement work. Ziemer and Canova Calori have earlier developed a decision modeling approach for analyzing requirements configuration trade-offs in time-constrained web application development. Their method aims at bringing stakeholders together to share knowledge and to decide on a configuration for the next release that satisfies all stakeholders. In this paper they report results from an industrial experiment where the method has been tried out with positive results.

The field of software process improvement quickly evolves and develops. Session IV presents some new approaches to SPI. Rejas-Muslera et al. have noticed that current software process improvement models do not properly include processes for legal audits and more concretely legal risks management for each phase of the software development lifecycle. Authors argue that this bears a significant risk since the potential cost of an inadequate management of legal aspects can even contribute to the failure of the project. Authors propose a process for managing legal risks by a sequence of steps to be taken in each life-cycle phase. López-Cortijo et al. address an important problem in the SPI field, namely, how to convince senior management to sponor SPI initiatives. Authors introduce a concept SPI value management, which enables benchmarking with successful histories by means of case studies. This is supported by a technique to formalize the information enclosed in an SPI case study providing an easy access to the relevant information of an SPI initiative. Dingsøyr et al. approach software process improvement from the knowledge management perspective. In their exploratory study, they try to improve organizational learning by systematically reviewing the results of a series of project postmortem reviews.

The papers in section V present new approaches and methodologies to better implement SPI in organizations. The paper from Levent Yilmaz illustrates, for instance, that there is a need for a software process simulation framework that represents not only technical activities, policies, and procedures, but also the resources, preferences, and human factors, together with functional and social organization and strategic management, all in unified and coherent terms. M. Zhang et.al. describe in their paper how complexity metrics are used in open source development projects to analyze specific situations, such as the relationship of complexity and the number of faults in the components. The analysis based on the CVS version control system of Eclipse JDT open source project and compared three different complexity metrics to perform such an analysis. M. Montoni et.al. analyzed critical success factors in SPI projects. The paper lists 25 major success criteria and

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