Preface

In recent years, Software Process Improvement (SPI) has emerged as the dominant approach for delivering improvements to the software product in software development organizations (Shih & Huang, 2010). SPI initiatives have been around for many years with the growing globalization of software development is making them increasingly important (Niazi, Babar, & Verner, 2010).

SPI is a systematic approach to increase the efficiency and effectiveness of a software development organization and to enhance software products (Unterkalmsteiner, et al., 2012). In other words, software process improvement methods help to continuously refine and adjust the software process to improve its performance (Petersen & Wohlin, 2010). According to Müller, Mathiassen, and Balshøj (2010), it dates back to the founding of the Software Engineering Institute at Carnegie Mellon University in 1984 and the publishing of Watts Humphrey’s book *Managing the Software Process*. Since then, many of the software development organizations think about existing models and standards, such as ISO 9000 series of standards, ISO 15504, the Capability Maturity Model (CMM), and the Capability Maturity Model Integrated (CMMI) from the Software Engineering Institute (SEI) (Sun & Liu, 2010). SPI attempts to change how software professionals think and act in their everyday organizational activities. SPI involves understanding existing processes and changing these processes to improve product quality and reduce cost and development time (Shih & Huang, 2010).

Process improvement related to outsourcing has grown rapidly, and two new topics, contract engineering and risk management, have risen. However, the number of reported cases of failure is increasing. The failure is caused by many factors, including: inadequate project management, poor requirements definition, inadequate supplier selection, deficiencies in technology selection, and the lack of change management controls. The majority of project failures could be avoided if the acquirer learns how to prepare or evaluate properly the contracts. Risk management is also critical to the success of acquisition projects. Managing risk is essential to project activities every day to achieve the projects’ objectives and hence its success.

Another management topic that is always included in process improvement is the estimation process. There are aspects of the process that are peculiar to software estimating. Some of the unique aspects of software estimating are driven by the nature of software as a product. Other problems are created by the nature of the estimating methodologies. One of the first key points in any estimate is to understand and define the system to be estimated. Software process improvement is an opportunity for put in place new estimation techniques tailored to new approaches.

Organizations have recognized that the control of their software processes affect the success of their projects. A new research line based on process improvement in very small enterprises has arisen in order to facilitate competitive capabilities for this environment. Team Software Process (TSP) and Scrum are frameworks that allow organizations focus on real business value. They guide teams in managing schedule and quality.

As a result of its influence, SPI has become the primary approach for improving software quality and reliability, employee and customer satisfaction, and return on investment (Mathiassen, Ngwenyama, & Aaen, 2005). However, even when many organizations are motivated to implement software process initiatives, not all of them know how best to do so. This situation increases the need to develop methodologies that allow implementing process improvements focused on the needs of organizations and in a pace supported by them. Nevertheless, in order to be useful, these methodologies need to evolve. In this book, the use of knowledge management, and most recently, ontologies, social networks, and cloud computing (new ways for implementing improvements) are presented.

The scope of software process improvement goes far, including a wide range of possibilities such as putting in place new estimation techniques tailored to new approaches, combining agile methodologies with defined process in order to get better results. Finally, and not less importantly, process improvement could be implemented in outsourcing environments having better contracts or having a better risk identification. These topics are also developed in the book. In what follows, the organization of the book and the sections that it contains are shown.

**ORGANIZATION**

The book is structured into two sections with the following major themes:

**Section 1:** Innovative Agile Development and Estimation Techniques
**Section 2:** Software Process Improvement

The next paragraphs provide a short introduction to each chapter.
Section 1

Section 1, “Innovative Agile Development and Estimation Techniques,” includes a set of six chapters. This section is devoted to presenting techniques ranging from a proposal of process libraries for agile environments and a study of risk management techniques, including a review of estimation in small teams and how to apply agile process to develop mobile apps. The section ends by exploring the impact on development of the personalities of team members.

Chapter 1 presents a case study of applying two proposals of process libraries in an agile software division. Based on a study of the practices of a set of three projects, Hugo A. Mitre and Leonardo Bernon-Angarita identify the good and bad practices.

Chapter 2 is titled “Technique for Risk Identification of Software Acquisition and Information Technologies.” In this chapter, Gloria P. Gasca-Hurtado, Jaime A. Echeverrri, and Maria Clara Gómez present an approach for applying risk identification in any acquisition project.

Chapter 3, “Assessing Modularity in Java Programs,” by Jorge Manjarrez and Víctor Navarro, presents a review of important metrics to quantify coupling and cohesion, and the assessment of tools to automate their recollecting in medium and large Java programs.

Chapter 4, “Estimating Methods for Small Teams,” by Tomás San Feliu Gilabert and Magdalena Arcilla, reviews the estimation techniques focused on small teams. The techniques are based on one principle: easy to learn, easy to apply.

Chapter 5, “Adapting Agile Practices to Mobile Apps Development,” by Alberto Heredia, Javier García-Guzman, Roberto Esteban-Santiago, and Antonio Amescua, proposes an agile mobile app development process. Marketing issues are also considered in the proposed process, as they are necessary to advertise the mobile app.

Chapter 6, “The Influence of Personality Traits on Software Engineering and its Applications,” by Adrián Casado-Rivas and Manuel Muñoz-Archidona, reviews the personality traits theories that have been widely adopted. The study of personality traits helps to motivate team members.

Section 2

The main objective of this section is to provide an overview of the field of the Software Process Improvement by collecting various research works from different domains. Chapters 8 and 9 provide background information on software process improvement. Chapters 10, 11, and 12 give information on applying the knowledge management to process improvement. Chapters 13 and 14 provide guidance on defining software architecture processes. Chapters 15 and 16 present case studies of successful improvement experiences and analyze their benefits. Chapter 17 focuses on studies related to how organizing teams and their training needs. Finally, chapter 18 provides guidance on contracting outsourcing and cloud services.

The information in this book is designed to provide a comprehensive foundation of the strategies and techniques to improve teams, departments and organizations.

Chapter 7 by Mirna Muñoz and Jezzreel Mejia presents a methodology that allows the use of a multi-model environment as a reference model. An organization can select best practices that best fit in the way the organization works to implement process improvement.

Chapter 8 is titled “Some Key Topics to be Considered in Software Process Improvement.” In this chapter, Gonzalo Cuevas, Jose A. Calvo-Manzano, and Iván García present a set of relevant aspects that may have a strong influence on the effectiveness of software process improvements. This chapter
provides information about successful change management as well as advice on qualification of the workforce and technological tendencies.

In chapter 9, Alberto Heredia, Javier García-Guzmán, Fuensanta Media-Domínguez, and Arturo Mora-Soto present a study titled “Managing Tacit Knowledge to Improve Software Processes.” The aim of this chapter is to present a framework for process improvement based on the enrichment of organizational knowledge by means of the acquisition of tacit knowledge.

Chapter 10 is titled “Towards Knowledge Management to Support Decision Making for Software Process Development,” by Edrisi Muñoz and Elizabeth Capón-García. It presents a proposal of framework to integrate the different decision levels in software development companies in order to reach their business objectives.

Chapter 11 is titled “Software Process Improvement in Small Organizations: A Knowledge-Management Perspective.” In this chapter, Ismael Espinosa-Curiel, Jose A. Fernández-Zepeda, Ulises Gutiérrez-Osorio, and Josefina Rodríguez-Jacobo discuss the importance of Knowledge Management for micro and small-sized enterprises that are implementing a software process improvement initiative. The authors present the knowledge created or required to accomplish the implementation of this type of initiative. A proposal of requirements for a support knowledge management tool is presented.

Chapter 12, “On Software Architecture Processes and their Use in Practice,” by Perla Velasco-Elizondo and Humberto Cervantes, reviews methods for software architecture development and their adoption issues. A positive experience where the adoption issues were addressed successfully is presented.

Chapter 13 is titled “A Method to Design a Software Process Architecture in a Multimodel Environment: An Overview” and is authored by Mery Pesantes, Jorge L. Risco-Beccera, and Cuauhtémoc Lemus. The work presents an overview of the method to design software process architecture. This method will assist process stakeholders in the design, documentation, and maintenance of the software process architecture.

In chapter 14, Antonia Mas and Antonio L. Mesquida present a study titled “A Successful Case of Software Process Improvement Programme Implementation.” The work describes the experience of a Spanish company founded in 2000, which bet strongly on quality as the way to progress towards maturity. The authors discuss the continuous evolution of the company experiences through the implementation of quality standards. The experience obtained from continuous improvement has helped to deploy a knowledge reuse strategy.

In chapter 15, Sanjay Misra, Martha Omorodion, Luis Fernández-Sanz, and Carmen Pages present a study titled “A Brief Overview of Software Process Models: Benefits, Limitations, and Application in Practice.” The aim of this work is to evaluate the benefits and limitations of some of the software development models while offering a comparative analysis and data on their usage.

Chapter 16 is titled “Learning to Innovate: Methodologies, Tools, and Skills for Software Process Improvement in Spain” and authored by Félix A. Barrio and Raquel Poy. In this chapter, the authors attempt to empirically reveal the health of Spanish organizations in terms of software process improvement. The analysis found that a significant number of organizations do not have specific training programs or a software quality department.

Chapter 17 is titled “Social Network Analysis for Processes Improvement in Teams.” In this chapter, Alejandra García-Hernández examines different social network properties that may have an impact on the team’s productivity. A second goal is to generate knowledge that may help to improve processes in the organization.
The final chapter in the book, chapter 18, is titled “Cloud Computing Decisions in Real Enterprises” by Manuel Pérez-Cota, Ramiro Gonçalves, and Fernando Moreira. The authors describe the different computational models and their impact on business. It presents a proposal of a framework to integrate the different decision levels in software development companies in order to reach their business objectives. This work examines the critical elements of cloud computing and establishes potential risk items. Finally, it identifies different users’ needs and different cloud computing services.

CONCLUSION

This book presents original works and interesting case studies arising from research with the Agile estimation techniques and Innovative Approaches to Software Process Improvement. The goal of this book has been to put together in one place the papers presented in the First International Conference on Software Process Improvement 2012. This book aims to promote the ideas and technologies that promote the use of the new techniques to improve the process at all stages of software development and IT services. The book is organized into two sections to cover Agile techniques and Software Process Improvement. The chapters offer ideas on adapting agile techniques, selecting best practices in multi-model environments, introducing knowledge management initiatives, and introducing innovation in software improvement.

Ricardo Colomo-Palacios
Universidad Carlos III de Madrid, Spain

Jose Antonio Caolvo-Manzano Villalón
Universidad Politécnica de Madrid, Spain

Antonio de Amescua Seco
Universidad Carlos III de Madrid, Spain

Tomás San Feliu Gilabert
Universidad Politécnica de Madrid, Spain

REFERENCES


**ADDITIONAL READING**


