Implementing Software Process Improvement Initiatives (SPII) – What are the Challenges?

Dr. Ernest Wallmüller

Qualität & Informatik
Haslernstr.14
CH-8984 Geroldswil
wallmueller@itq.ch

Abstract: Literature [Gra97] claims that up to 70% of software process improvement initiatives fail to achieve their intended goals. No single organization is likely to have the range of experience necessary to identify these critical factors. We need to examine abroad sample of projects undergoing SPI in order to determine characteristics that successful SPI efforts have in common, characteristics that unsuccessful SPI efforts have in common, and the factors that distinguish successes and failures. It seems likely that the answers will depend to some extent on the particular improvements attempted, the characteristics of the organization undergoing improvement, the application domain, the technical environment, and the people involved. Any effort to understand the results of SPI must take factors like these into account. The talk will address the key factors and constraints of software process improvement based on experiences with different companies in Europe.

1 Current State of SPII

Software is a key business driver in the business today. As an example a customer project implements a totally new battery system for a new electrical car. This innovation is not possible without software. Time–to-market and cost focus considerations are normal restrictions to such projects. We always have to ask how dependent systems are from software and which role the correctness of these software systems plays to our business. Other interesting questions are how mature the organization and the management that implements such systems are and who is driving leadership for quality in such an organization.

1.1 What is Software Process improvement (SPI)?

With SPI we try to improve the processes in our projects by using best practices coming from models such as CMMI-DEV, CMMI.ACQ, ISO 15504, Automotive SPICE or TPI.

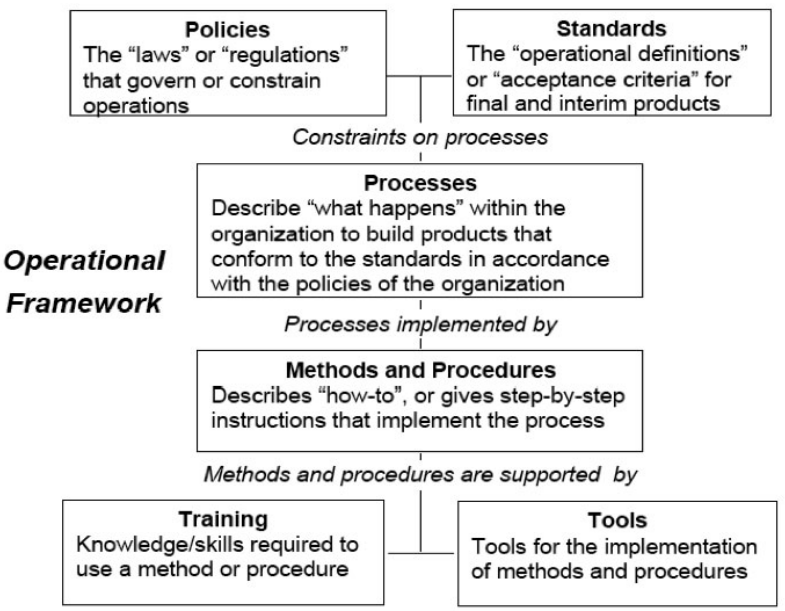
These are well established process improvement frameworks and they are used very intensively worldwide. But we have to consider more and more who is doing the projects in those organisations and what are the values, beliefs and attitudes of that people. These aspects are critical if we try to change processes in projects and coach the people to do their job in a better way.

1.2 Process Engineering Fundamentals

The SEI [Hum99] has defined what is all necessary for an operational useful process framework. For implementing better processes we need policies that are "laws" and "regulations" that govern or constrain the process operation. Policies have to be authorised from executive management and all parties in the organization have to be committed to them.

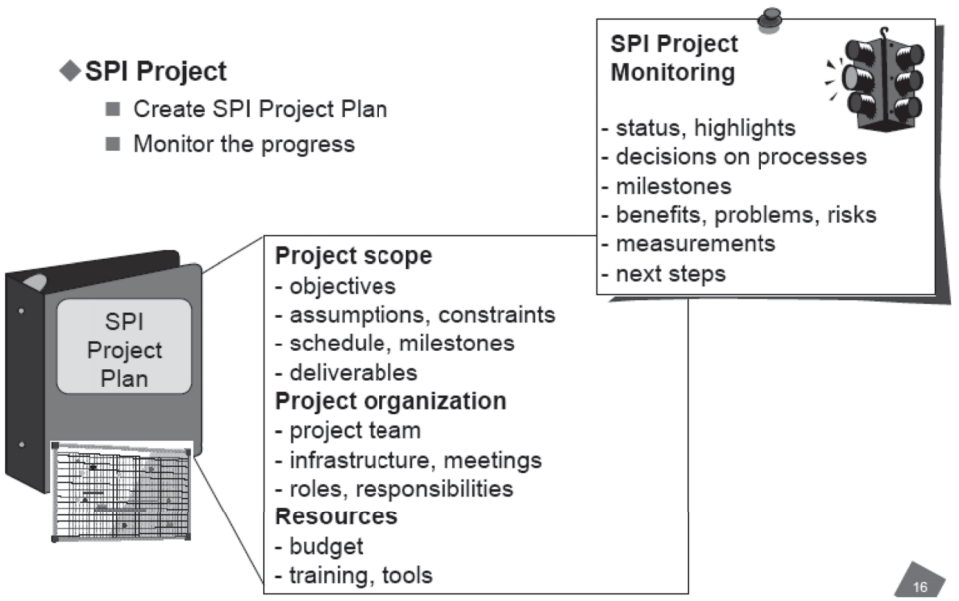
Furthermore important are standards, external or internal standards such as IEEE, ISO or other standards, that have to be considered at design of the processes. Policies and standards are constraints on processes.

Good process descriptions give a clear and handsome picture which roles, artefacts and activities are in place and what happens in the organization to build the products that conform to standards and in accordance to the policies of the organization. Processes are implemented by methods and procedures. Methods and procedures are supported by training and by tools. Training delivers knowledge and skills required to use a method or procedure. Tools help to implement methods and procedures. They are very important for an efficient process performance when the organization gets on a higher level.



Picture 1 Process Engineering Fundamentals

A first critical success factor for a SPI initiative is that You have to consider is the fact, SPII is project or a program with rights and duties. You have to find an experienced project leader who is capable to plan and start up the SPI endeavour. Especial consideration has to be shown to the scoping and estimation of effort of the SPI initiative. The SPI project has to deliver status reports on a regular base and should be controlled by a steering committee and by the SEPG.



Picture 2 SPI Initiatives as a project

1.3 SEPG

A Software Engineering Process Group [Wal07] or shorter an SEPG is a mean to organize, develop and transfer the improvements into the organization that is responsible for and runs the projects. This group has a head who normally is a leading manager of the software development department. The SEPG uses working groups to solve the different work packages of improvements. These groups are temporarily and finish after having done their jobs. The SEPG is controlled by a steering committee. The connection to the projects is done via process liaisons, people that support and coach the projects in implementing all the new processes or the relevant improvements.

1.4 Cooperation via integrated teams

Cooperation and good coordination are relevant on all levels of management and on the level of project practitioners. To push and motivate for cooperation we have used the concept of integrated teams, a kind of multifunctional workgroups, that are going to

develop a common vision, a team charter and have decision making processes that are it disturbed by line management.

1.5 "Low hanging fruits"

First results of process improvement should be gained very early to get acceptance under the project people and to demonstrate the progress of your achievement to the middle management. To find these first results You have to address the current project problems and provide visible benefits to pilot projects and the organization. Picking up "low hanging fruits" also means improvements with low effort and high impact and generates short term wins (days and weeks not months and years).

2 Typical challenges of SPI initiatives

Challenges of SPI programs have to do with organizational changes and failures in designing the SPI endeavour. Failures in SPI projects can be classified in strategic ones, planning failures and in execution failures. Examples of failures in strategy are:

- Failing to define reasonable goals and plans
- Failing to tie the improvement goals to business objectives
- Having inadequate resources and unrealistic expectations
- …

Examples of failures in planning are:

- Starting improvement efforts without an assessment or without SPI or model knowledge
- Running improvement efforts like another this means SPI projects without QA and a proper requirements and scope definition
- Achieving a level as a single goal

Examples of failures in execution are:

- Ignoring middle management. Middle management stand to lose the most and are the most effective in resisting change.
- Confusing institutionalization with standardization. A strong culture does not imply everybody does it in the same way.
- Trying a do-it-yourself approach. SEPG skills are different from software development. Organizational change management skill are necessary.
- Not considering line of command

One oft the most critical things is obtaining sponsorship and commitment. Active sponsorship gives clear directions, defines objectives, secures resources, shows interest in the progress on regular base, removes barriers and obstacles and walks the talk.

3. Summary

SPI initiatives means a lot of challenges, risks but also long lasting investments and benefits. SPI has to do with continuous improvement and permanent learning better practices. Working on processes also means work on a better management system.

Nevertheless a software organization can win a lot of reputation by increasing organization maturity and a better productivity. Software employees are no longer heroes but have not any more a permanent stress situation and much more spare time.

Literature

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