The SPI Manifesto and the corresponding ECQA certified SPI manager Training

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Abstract

In order to define a modern approach for Software Process Improvement (SPI), the SPI Manifesto was developed, discussed, and finalized at the 16th EuroSPI Conference in 2009 in Alcala, Spain. The common understanding gained during the discussion and usage of the manifesto formed a nucleus from which the new ISO/IEC 33014[ISO01] was derived. In parallel to the development of the SPI Manifesto, the SPI manager Training was developed by the European Certification and Quality Association (ECQA) under Sponsorship of the European Commission. The goal of the training was to address all topics mentioned in the SPI manifesto and also include additional topics seen as useful for mangers dealing with SPI.

Key-words: Software Process Improvement. ISO 33014, SPI Manifesto, SPI Manager Training, Agile manifesto.

1. Introduction

In the 1st decade of the 21st century, it became clear that system and software development are going to face a massive change of paradigms. Following ISO 9001 and / or CMMI level change campaigns many organisations implemented Software Engineering Process Groups (SEPG)[Kasse04] that created a huge amount of process bureaucracy. And a lot of these SEPG's failed when challenged with the speed requirements of the internet age. So in 2001 a group of experienced software managers developed and published the agile manifesto. While first implementations like extreme programming (XP) did not seem to have real influence on SPI, things changed radically when Scrum became part of the game. Even if some SEPG's recognized that a well organised agile development could be rated as

CMMI level 3, they did not find an approach to help organisations speeding up.

This situation forced a complete rethinking of what SPI should be and could be. Instead of bureaucracy and intranet publishing business success, change and people involvement were seen as the new cornerstones of SPI management.

In order to enable SPI responsibles to step up with these new paradigms an SPI manager training was created by a team of experts forming the SPI manager Job Role Committee (JRC) at ECQA. 1st trainings were launched in 2010 making the background knowledge of the SPI manifesto available to the market [Schweigert09], [Korsaa12].

2. The SPI Manifesto

In this section, the SPI manifesto [PriesHeje10] will be presented, values and principles will be described.

2.1 Background

When we look at sources like the Chaos Report also referred to in [Standish2014], we have a stable set of up to 40 % of large software projects that fail and another 50% with delay, poor product quality and budget overrun. The typical reaction of organisations is:

- Invest in new technologies
- Formalize processes

In most cases, this approach ends up in a mail stating that the projects have to use a new tool and that new and mandatory processes are published on the intranet.

At the end, the projects realise –if they are able to find the new processes in the intranet – that the new tool provides poor support to the new processes and has insufficient interfaces to the rest of the software development environment.

As a result, the new tool and processes are ignored or additional time and budget is spent by the project to make the tool and processes suitable for the needs of the project. The effect is delay and budget overrun. At the very end, process performers and management loose confidence in process improvement.

Similarly to the Chaos Report, Joyce Statz, Don Oxley and Patrick O'Toole analyzed the major risks for SPI failure

[Statz97]. They found out, that there are some typical risks for SPI projects like

- Organization instability, such as high employee turnover.
- Frequent structural changes in the organization (every six months or less for the last several years).
- Significant change in business focus in the last three to six months.
- Threat of or impending sale (or merger) of the organization.
- Lack of management commitment (lack of personal time invested in SPI).
- Unfounded expectation of a fast pace of change.
- Lack of knowledge about how to proceed.
- Project management and project team resistance to change.
- Project schedules that restrict time for learning about new processes.
- Difficulty in measuring the impact of changes because of a previously chaotic environment.

Even if this analysis was done several years ago, from practical experience it still addresses the main risks of SPI projects. We can't prove that 70% of all SPI initiatives still fail [Gilb04], [Centraline04] but we did not find younger studies that deliver more optimistic data either. Indeed, there are other sources that add some risks to the portfolio

- Poor communication
- Critical success factors not identified

As we can see, there are a lot of risks and challenges in SPI projects, some more generic as they might apply in all projects, others very specific to SPI. For readers interested in detailed further reading, there is a compilation of references developed by Mark Paulk [Paulk10].

But there are not only issues which we would attribute to management techniques, there are also personal demotivators which have to be taken into account [Baddoo08], [Standish2014], e.g.

- Budget Constraints
- Commercial pressures
- Cumbersome processes
- Customers
- Fire Fighting
- Imposition

- Inertia
- Irrelevant objectives
- Isolated best practices
- Lack of evidence of direct benefits
- Lack of feedback
- Lack of SPI management skills
- Lack of standards
- Large Scale programmes
- Low process priority
- Negative / bad experience
- Organisational changes
- Personality clashes
- Reduced creativity
- Workload

On the other hand, we find lots of success stories. So in principle, successful SPI must be achievable. We think one key factor is a skilled SPI management. Experts like Tim Kasse have always stated that there is a need for the Role Process Improvement Manager. A more detailed organisation of SPI management can be found in the book by Johansen & Pries-Heje [Pries-Heje13].

We see that there is need for SPI management skills and a consensus that there should be formal SPI related roles in SPI projects. To satisfy this need, a formal SPI manager education is needed beyond standard project management or standard process engineering. Properly educated SPI management experts will make sure that the money spent by the management and the support of the process performers does lead to success and not to frustration.

2.2 Values of the SPI Manifesto

The SPI Manifesto states 3 core principles of modern SPI:

- We truly believe that SPI must involve people actively and affect their daily activities
- We truly believe that SPI is what you do to make business successful
- We truly believe that SPI is inherently linked with change [PriesHeje10]

2.3 Principles of the SPI Manifesto

The principles of the SPI manifesto were organised around the given values.

2.3.1 People Involvement

The need for people involvement was declared by the SPI manifesto using the following arguments:

- A.1 Context and problem In the last decade we have seen the growing of ivory towers in many

organisations, using 'magic' tools and models to paint process diagrams. However, in most of these organisations, the projects and services did not really use these processes. So the ivory towers have had limited success as drivers of SPI, and it is now time to bring SPI to the people who will be most affected.

- A.2 Value explained Business success depends on the competitiveness of an organisation. The competitiveness of every organisation is based on the knowledge, engagement and commitment of the people working in it. SPI is a tool to improve the competitiveness of organisations. Bringing this together, we believe it becomes clear, that only active involvement of the people working in an organisation ensures the success of an SPI initiative from the business perspective! Successful SPI is based on actively involved people having sufficient information and training.

- A.3 Hints and examples The modern organisation paradigm is a change from experts solving problems and trying to force change on organisations to the organisation's people solving problems and changing the organisation together. Japanese improvement efforts such as Kaizen have demonstrated this convincingly in the 20th century. More recently, we also see this in the growing success of agile development approaches. Enablers for success in modern organisations include people making full use of their experience, taking responsibility for change on their project and throughout their organisation, and using and improving the processes they have helped to define.

Given that explanation the following Principles were added to this value:

- Know the culture and focus on needs
- Motivate all people involved
- Base improvement on experience and measurements
- Create a learning organisation

Even if the value and the associated principles seem to be clear and concise, creating an associated training forced the JRC team to deal with the work of Hofstede, Zur Bonsen, Robert W. Jacobs, and the ISO/IEC 15939 [ISO02].

2.3.2 Business Success

The focus on business success was declared by the SPI manifesto using the following arguments:

- B.1 Context and problem: The software process creates software. Software Process Improvement means activities that improve the way of creating and

implementing software. However, many people believe that they don't need processes in order to build and ship software products. This belief may be the source of most resistance to change met by SPI professionals. But the fact is that you cannot create software without process. Another problem is when 'process' is seen as 'somebody else's process description.' This again leads to the misconception that one can do without process. Software should not be created without process; however, what is important is that you have process that fits the need of your projects and your business.

- B.2 Value explained: Process descriptions are just words – we believe the process should bring value to the business. To have success with SPI we must ensure that improvement recommendations are targeted to the actual business-related objectives, rather than compliant with a generic standard. We must also close the gap between 'the process' and 'how the work is really being done'; we believe that words and actions consistently should communicate the unity of the two – not the decoupling. B.3 Hints and examples: Use today's implemented processes as an agreed baseline for process improvements. Understand the business objectives in order to ensure that suggested improvements will be effective in supporting these. Always refer to the process description as a representation of the process. Communicate how standards and models is meant to support SPI. This continuous communication at all levels of management and practitioners helps managers and practitioners to understand how and why they need to support the SPI activities. If you are using a maturity model to inspire improvement, you should respect that at maturity level 3, the process belongs to the organisation. At maturity level 2, the process belongs to the project. And at maturity level 1, the process belongs to the individual level.[PriesHeje10]

Given that explanation the following Principles were added to this value:

- Support the organisation's vision and objectives
- Use dynamic and adaptable models as needed
- Apply risk management

2.3.3 Change

The relevance of change was declared by the SPI manifesto using the following arguments:

- C.1 Context and problem: Only in a perfect world is there nothing to improve. We believe that all improvement involves change; for the individual, the project, and the organisation. We know that it is difficult for people to accept or adopt change, because they are comfortable doing things the way they always have, even if it costs them overtime or loss of social

interaction. Never the less, we need to face the need for change when doing SPI.

- C.2 Values explained and Interpreted: So Software Process Improvement means change! Realising this means an organisation must ensure that the process improvement infrastructure has a change management component in it. It is essential for an organisation to launch a process improvement initiative and to obtain measurable business results together with satisfied employees.
- C.3 Example :An IT organisation in a predominantly Asian culture wanted to enact a SPI program and achieve CMMI Maturity level 3 at the same time. One change required was to institutionalise peer reviews. But practitioners did not want to review colleagues' work and offer input that suggested major defects were found and needed to be corrected. Peer review training was repeated every six months, while videotaping the consultant coaching a live peer review. After three years, the results of using peer reviews could not be cost justified. The consultant explained to the CEO that if major defects were not found in peer reviews, but by the organisation's customers, everyone would lose face, including the top managers. Jobs could be lost as well. The CEO then appointed top middle managers to serve as coaches, and encouraged all project members to participate in peer reviews, concentrating on the most costly major defects. When the practitioners saw management's commitment to change, and saw that no one was getting fired or being demoted because they found and reported major defects, they participated willingly. The product quality went up, jobs were kept, profits increased, and lifestyles improved due to less time needed in finding defects. After a successful assessment, the CEO declared that this cultural change was the most significant event in the process improvement initiative.[PriesHeje10]

Given that explanation the following Principles were added to this value:

- Manage the organisational change in your improvement effort
- Ensure all parties understand and agree on process
- Do not lose focus

These values and principles of the SPI Manifesto cover all aspects of modern SPI

3. The European Certification and Qualification Association (ECQA)

ECQA is a result of a number of EU supported initiatives in the last ten years where in the European Union Life Long Learning Programme different educational developments decided to follow a joint process for the certification of persons in the industry [ECQA10]

Through the ECQA it becomes possible that a person attends course for a specific profession in e.g. Slovenia and performs a European wide agreed test at the end of the course. The certificate will then be recognized by European training organizations and institutions currently in 18 member countries.

To make sure that this works a rigorous approach was implemented based on the components Skill Set, European Test Pool and The ECQA Website www.ecqa.org

- Skills Sets: A defined set of quality criteria that has to be followed to create the learning objectives and syllabus for new professions. Only skills sets which fulfil the defined criteria are accepted by the ECQA.
- European Test Pool: Assuming that a group of training bodies agree on the same skills set, then students must be able to pass a test independently from the region or country in a Europe wide scope. This is the reason why a Europe wide pool of test questions plus European test portals have been set up and allow a cross-European Internet based collaboration. The system is based on the results from the former EQN project 2005 – 2007, and supported and automated by an online system.

ECQA supports currently more than 21 professions in Europe. ECQA offers certification for professions like IT Security Manager, Innovation Manager, EU project manager, E-security Manager, E-Business Manager, E-Strategy Manager, SW Architect, SW Project Manager, IT Consultant for COTS selection, Internal Financial Control Assessor (COSO/COBIT based), Interpersonal Skills, Scope Manager (Estimation Processes), Configuration Manager, and SPI Manager. Currently new professions such as Integrated Mechatronics Designer, E-Learning Manager, and Terminology Manager are being integrated until 2010 /19/

To enable an effective and scalable certification scheme, ECQA has defined common principles /8, 5,18/. The main idea is that the certification body, the training provider and the examination holder are independent entities. They use a common

administrative and technical infrastructure which includes course management, eLearning environment and self-evaluation/examination system. Each skills set is described as a skill card. The most essential management concept of ECQA is the Job Role Committee, established separately for each job role. As a summary, the leading principles are /5/:

- Job Role Committee (JRC): One European consortium is built per accepted profession to annually update the skills set and create a European wide test questions pool.
- Defined Certification Rules and Procedures: The acceptance of professions and skills sets and the certification of students are based on defined quality rules and certification procedures.

4. The SPI Manager Training

In parallel to the development of the SPI manifesto the SPI Manager Training was developed under the governance of the ECQA.

4.1 Background of the SPI manager Initiative

As discussed in the context of the SPI Manifesto, a high proportion of software projects actually fail. Most common reasons are known to be the lack of management commitment and unrealistic expectations. This is unfortunately a statement which is too general to be useful for avoiding failures. Digging one step deeper, we find poor understanding of competences, roles and responsibilities of process improvement activities and tasks which led to inadequate training and qualification of various PI professionals. [Messnarz08]

ISO/IEC 15504 Part 4[ISO03] was published in 2004. It became the first nucleus of a body of knowledge of process improvement. Process improvement was described in a cycle of 8 steps. In the following period, many ideas were launched.

In 2008, DELTA Axiom published the results of a three year research program, in which DELTA, the IT University of Copenhagen and four main players in the financial sector studied successes and failures in process improvement. ImprovAbility^{TM} is a powerful model to support improvements by analyzing the need for the improvement,

the project, the deployment and the organisation. [Pries-Heje07]

Based on the indentified risks and the defined "nature" of the organisation, ImprovAbility^{TM} can recommend actions and the most suitable change strategy.

The change strategy is recommended out of a set of change strategies grouped into ten families. Each one will be more or less effective depending on the specific context.

- Commanding

Change is driven and dictated by (top) management (owner, sponsor and change agent)

- Employee driven

Change is driven from the bottom of the organizational hierarchy

- Exploration

Change is driven by the need for flexibility, agility, or a need to explore new approaches.

- Learning driven

Change is driven by a focus on organizational learning, individual learning.

- Metrics driven

Change is driven by metrics and measurements

- Optionality

Change is driven by the motivation and need of the individual or group.

- Production organized

Change is driven by the need for optimization and/or cost reduction

- Reengineering (BPR)

Change is driven by fundamentally rethinking and redesigning the organization.

- Socializing

Change in organizational capabilities is driven by working through social relationships. Diffusion happens through personal contacts rather than through plans and dictates.

- Specialist driven

Change is driven by specialists (professional, technical, or domain experts). [Pries-Heje13]

The team behind the ImprovAbility Model also played a central role in the development of ISO/IEC 33014 also the research experience and the ImprovAbility^{TM} practices are incorporated into the SPI manager training.

In parallel, the authors who also contributed to the SPI Manifesto, developed a syllabus for the SPI Manager Training. This development was organized by the EU Cert project since late 2008. The SPI Manager training

and certification scheme addresses al lot of process management areas (Software, Systems, Services but also Testing). The vision is that it will cover the full set of PI professions and will be suitable in the future for other domains than software, systems and services. The certification is managed in a non-profit association, called European Certification and Qualification Association ECQA [Schweigert09], [Korsaa12].

4.2 The content of the SPI Manager Training

The SPI Manager Training strongly focusses on the needs of people managing SPI. It was assumed that people manging PI need a broader view on the PI related issues such as culture and change.

The training consists of the following topics:

- Alignment of PI Goals to Business Goals
- Capability and Maturity Models
- Deployment of SPI
- Experience and Good Practice Sharing
- Generic Process Description Models
- Multi Cultural Teams
- Organisational Culture
- PI Change Strategies
- PI Facilitation Techniques
- PI Leadership
- PI Measurement and Analysis
- PI Reporting
- PI Team Communication
- Planning PI
- Process Improvement Models
- Process Measurement
- Process Thinking
- Software Process Design and Process Description Models
- Supporting Top Management [Korsaa12]

These learning blocks have mutual cross references to the SPI Manifesto.

One of the main experiences from training delivery is, that there is real relevance of the role of the attendee.

Attendees with management roles show a much better performance in training and testing than people with technical roles.

Each Topic is linked to a part of the SPI manager Skill set and to the skill requirements of the SPI manager Exam

Even if the Job Role Committee(JCR) recommends to undergo the training before examination it is possible to undergo the SPI Manager exam by just studying the skill set and reading the SPI-Manifesto. It is not required that a formal SPI manager Training was attended.

5. Discussion

The SPI Manager Qualification was presented in several conferences, and also several publications were developed. Participants on management level were very happy with the training.

But even if the relevance and validity of the content were proven by these attendees the sales figures in Germany show that the SPI Manager training did not completely reach its intended audience.

There were also other issues mentioned in the JRC:

- one issue is that maybe people believe SPI is for software, but the PI part is working on nearly all areas [van Loon2012]
- one issue is that professions like SW tester (there are many SW testers in the world) rather earn with exams than with the training because skills are there but there was no way to certify it before
- one issue is that our PI thinking is very much European driven and Japanese, Chinese, USA approaches are not equally represented.

The JRC is currently analyzing this situation and checking if traditional classroom training is adequate for the target group or if new didactical concepts have to be taken into account.

Taking the experience of the day to day work in PI into account, the SPI Manager Skill Set is still valid even in times of SCRUM.

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