Lessons Learned and Recommendations from two Large Norwegian SPI Programmes

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Abstract: Software development is an experimental discipline, i.e. somewhat unpredictable. This suggests that software processes improvement should be based on the continuous iteration of characterization, goal setting, selection of improved technology, monitoring and analysis of its effects. This paper describes experiences from the empirical studies in two large SPI programmes in Norway. Five main lessons were learned: 1) It is a challenge for the industrial partners to invest enough resources in SPI activities. 2) The research partners must learn to know the companies, and 3) they must work as a multi-competent and coherent unit towards them. 4) Any SPI initiative must show visible, short-term payoff. 5) Establishing a solid baseline from which to improve is unrealistic. Based on these lessons, a set of operational recommendations for other researchers in the area are proposed.

Keywords: software process improvement, empirical studies, industrial collaboration.

1 Introduction

Improving the software process, or the way and with what means we develop software, is recognized as a key challenge in our society – cf. the American PITAC report [1] and the European Union's framework programmes [2].

The first three authors of this paper were responsible for the software process improvement (SPI) work jointly conducted by three research institutions in two successive, cooperative, industrial Norwegian SPI programmes, called SPIQ and PROFIT. The fourth author was the overall manager of both programmes. A dozen software-intensive companies, mostly small- and medium-sized enterprises (SMEs) participated in the programmes.

This paper describes the main lessons learned from the seven years of experience in these two programmes from *the point of view of the authors*. We describe potential motivations for why companies and individuals take part in such a programme, and that many of these motivations may make the SPI work very hard. We also focus on requirements to the involved researchers for successful conduct of an SPI programme. E.g. they must familiarize themselves with each company, and work as a multi-competent and coherent unit towards the company. It is important to show visible, short-term payoffs, while complying with long term business strategies and research

objectives. Finally, we describe the importance of generating new understandings and new actions, in whatever order they evolve.

Based on these lessons learned, we propose a set of operative recommendations for other researchers in the area. We will also apply these recommendations ourselves in a new, successor SPI programme, SPIKE, that we have just started.

To make our general position on SPI more explicit, we will start by characterizing some existing SPI approaches and their assumptions. In our view, SPI covers both *process assessment*, *process refinement*, and *process innovation*. Typical improvement approaches have involved SPI frameworks such as CMM [3], BOOTSTRAP [4], SPICE (Software Process Improvement and Capability dEtermination, ISO/IEC 15504) [5], and the Quality Improvement Paradigm (QIP) [6]. CMM has later been supplemented with the IDEAL improvement model and with Personal Software Process and Team CMM.

Most of these frameworks have become well-known among practitioners and researchers. However, such frameworks implicitly assume rather stable and large organizations ("dinosaurs"?), and that software can be systematically developed in a more "rational" way – cf. the legacy of Total Quality Management (TQM) [7]. Frameworks in this category may indeed work well, if the focus is process refinement, as reported in success stories of using CMM in large companies like Hughes and Raytheon in the early 1990s and in more recent studies [8].

However, the opposite situation applies for small companies ("upstarts"?), relying on knowledge-based improvisation [9] to rapidly innovate new products for new markets. Even in the US, 80% of all software developers work in companies with less than 500 employees [10]; that is, in SMEs. Rifkin [11] blatantly claims that we have offered the "wrong medicine" to such companies, which have consequently failed in their SPI programs. In contrast to the mentioned CMM studies in the US, several European SPI studies have been performed about SMEs [12, 13]. These studies conclude that short-term priorities – combined with business and market turbulence – may severely prevent, hamper and even abort well-planned and pragmatic SPI efforts. Papers by [14] and [15] elaborate on some of these issues.

Our general position has therefore has been to downscale and make applicable approaches from several SPI frameworks, in particular QIP and TQM, and to apply these in concrete development projects called pilots. Organizational learning has been facilitated through various follow-up actions inside each company, as well as across companies through joint experience groups, shared programme meetings and seminars, technical reports, and two pragmatic method books.

QIP assumes that software development is experimental (not quite predictable) and therefore needs to be conducted accordingly. QIP suggests that projects within an organization are based on a *continuous iteration* of characterization, goal setting, selection of improved technologies, project execution with changed technologies, monitoring of the effects, and post-mortem analysis and packaging of lessons learned for adoption in future projects. Furthermore, measurement is regarded essential to capture and to effectively reuse software experience. An effective and long-lasting cooperation between academia and industry is also necessary to achieve significant improvements. See [16] for a reflection on 25 years of SPI work at NASA.

In our SPI programmes, individual pilots were implemented according to the model of the European System and Software Initiative (ESSI) [17]. Here, an improve-

ment project and a development project (pilot) are managed as two separate, but strongly connected parts – in a so-called Process Improvement Experiment (PIE).

The remainder of this paper is organized as follows. Section 2 describes the mentioned Norwegian SPI programmes and the approaches taken. Section 3 describes the lessons learned. Section 4 presents some operational recommendations based on the lessons learned. Section 5 concludes and contains ideas for further work.

2 The Norwegian SPI Programmes

This section describes the SPIQ, PROFIT and SPIKE programmes for industrial SPI in Norway. SPIQ and PROFIT are finished, while SPIKE is upstarting.

2.1 General about the Norwegian SPI Programmes

The first programme, *SPIQ* or *SPI for better Quality* [18], was run for three years in 1997-99, after a half-year pre-study in 1996. The successor programme, *PROFIT* or *PROcess improvement For IT Industry*, was run in 2000-02. Both programmes were funded 45% by The Research Council of Norway and involved three research institutions (NTNU, SINTEF, and University of Oslo) and ca. 15-20 IT companies, both SMEs and large companies. More than 40 SPI pilot projects have been run in these companies. A follow-up programme, *SPIKE* or *SPI based on Knowledge and Experience*, is carried out in 2003-05 with 40% public funding.

All three programmes were and are being coordinated and lead by one of the industrial partners, Bravida Geomatikk (previous part of Norwegian Telecom), which acts on behalf of one of the major Norwegian IT organizations, Abelia. The public support of ca. 1 mill. Euro per year is mostly used to pay 10-12 part-time researchers, travel expenses, administration and deliveries from the companies. The main annual contribution to a company is a fixed amount (now 12,500 €), plus 300-400 free researcher hours to help carry out a pilot project and thus improve each company. The companies may recently also be compensated extra for direct participation in concrete experiments (see section 4). A total of six PhD students will be funded by these three programmes (three of which have already received their PhD), and over 30 MSc students have so far done their thesis related to these programmes.

The programmes provide networks of cooperation both between researchers and the IT industry, between researchers on a national and international level, and among the participating companies. Figure 1 below shows the principle cooperation and work mode:

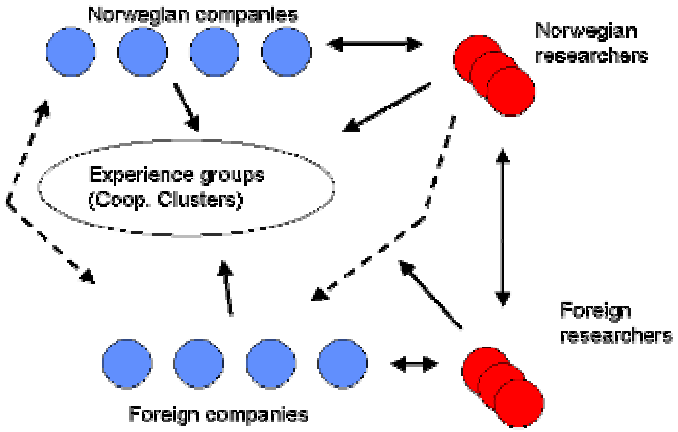

Figure 1. Cooperation mode in the SPI programmes.

Typical work in the industrial companies includes pilot projects to test out a given improvement technology, like novel inspection techniques, agile development methods, electronic process guides, or use of software experience bases for estimation (see later). There has been local planning and follow-up activities around each pilot project, involving one or two researchers and an industrial partner. There have also been monthly coordination meetings between the researchers and the programme manager, and two common technical meetings (seminars) per year. In addition comes researcher-lead experience groups (clusters) on subjects like experience bases and testing. A bi-monthly newsletter has been issued (on paper and web), and various technical reports written with industry as a targeted audience. International collaboration has in some cases also involved direct, inter-company exchanges.

Education has effectively been used to spread results. For instance, several revised and new courses have been extended with SPI-related topics and formal experiments around SPI. MSc and PhD students participate regularly in industrial case studies, and this has been highly appreciated by all parties.

This type of *shared collaboration programmes* over a sufficient number of years have proved advantageous in counteracting the volatility problems of SMEs and their priorities. *Learning* in our context therefore assumes *cross-company* activities, and thus willingness to share own experience, bad and good. Luckily, most companies have similar problems. That is, effective long-term SPI learning can take place as a joint endeavour by and for the IT industry. In this task, academia (the three research partners and their foreign contacts), the Abelia industrial association, and The Research Council of Norway act as initiating and coordinating bodies. Thus the *whole* IT industry can learn and improve, not only single and spurious companies (SMEs).

2.2 The SPIQ programme in 1997-99

We refer to the previous description of general work mode. The main result of SPIQ (www.geomatikk.no/spiq) was a first version of a pragmatic *method handbook* [19].

This handbook combined aspects of *TQM* and *QIP* including the latter's *Goal-Question-Metric* method [20] and *Experience Factory* concept [21]. SPIQ has furthermore, as mentioned, adopted the *ESSI* PIE model. An *incremental* approach was generally advocated, e.g., relying on action research [23]. Five *case studies* from the SPIQ companies were also documented.

2.3 The PROFIT programme in 2000-02

In PROFIT (www.geomatikk.no/profit), we applied the same overall work mode. We concentrated on improvement under change and uncertainty, learning organizations, and novel technologies like XP and component-based development. We also wrote a second, down-scaled and more accessible *method handbook* [24], issued by a Norwegian publisher.

Mostly in parallel with PROFIT, we are running an INTER-PROFIT add-on programme in 2001-04 to promote international experience exchange and cooperation between Norwegian and European companies and researchers. Cooperation agreements are in effect between INTER-PROFIT and the CeBASE (www.cebase.org) project in 2000-02 lead by University of Maryland, the ESERNET thematic network (www.esernet.org) in 2001-03 lead by the Fraunhofer IESE in Kaiserslautern, and VTT in Finland. Several joint seminars and workshops have been arranged. All three research partners participate in the International Software Engineering Research Network, ISERN (www.iese.fhg.de/ISERN).

2.4 The upstarting SPIKE programme in 2003-05

We have just started a successor programme in 2003-05, SPIKE (www.abelia.no/spike). The technical focus is adaptation and trials of "context-dependent" methods, i.e. finding out the "correct" application of e.g. incremental methods, object-oriented analysis and design, electronic process guides, knowledge management, and estimation technologies. As in SPIQ and PROFIT, we support empirical studies, shared activities like experience groups and seminars, international cooperation, and PhD studies. See section 4 on Operative Recommendations.

2.5 Some industrial and research goals

In these SPI programmes, some overall *industrial goals* have been (examples):

- at least half of the companies shall run an overall improvement program.
- all the participating companies shall continually run an improvement project linked to a pilot development project.
- all companies shall participate in at least one experience group, e.g. within:
  - SPI in changing environments (technical, organizational, and market)
  - knowledge management and experience data bases
  - model-based development (often based on UML)
  - project management and estimation
- all companies shall make presentations in national or international conferences.

Some *research goals* have similarly been (examples):

- develop methods and guidelines for process improvement with focus on experience and knowledge reuse techniques for environments with a high degree of change.
- document the results in articles and case studies.
- disseminate the results through a close cooperation with universities and colleges.
- contribute to PhD and MSc theses, and an updated curriculum in software engineering and SPI.

2.6 Some typical SPI pilot projects in SPIQ and PROFIT

Figure 2 shows nine typical SPI pilots with their companies and improvement themes:

- Fjellanger-Widerøe, Trondheim, 1998: Improving the inspection process.
- TietoEnator, Oslo, 1998-99: Establishing an experience database for consulting.
- Genera, Oslo, 1999-2000: Improving development methods for web-applications.
- Mogul.com, Oslo/Trondheim, 2000-01: Improving estimation methods for use cases.
- Kongsberg Spacetec, Tromsø, 2001: Establishing an experience database, using PMA.
- NERA, Oslo, 2001-02: SPI by incremental and component-based development.
- Ericsson, Grimstad, 2002: Improving design inspections by OO reading techniques.
- ObjectNet, Oslo, 2002: Experimenting with XP to improve the development process.
- Kongsberg-Ericsson, 2002: Comparing UML with textual requirement formalisms.

Figure 2. Examples of companies and work themes.

As mentioned, a total of 40 SPI pilots have been performed in SPIQ and PROFIT. This corresponds to about 10 pilots per year, as some went over two years.

2.7 Main results from the SPIQ and PROFIT programmes

The two programmes have achieved and reported results for many actors and in many directions:

1. for each participating company, e.g. improved methods and processes, and better process understanding,
2. for the Norwegian IT industry, e.g. as experience summaries with revised process guidelines and lessons learned, and by establishing meeting places such as experience groups, seminars, and a web site,
3. for the broader software community, e.g. as collections of published papers and international research cooperation,
4. for the research partners, e.g. as revised educational programs and through MSc and PhD candidates.
5. on a national level: creation of an SPI community between industry and academia, and internal in academia.

The main external results come from points 2 and 3, and comprise revised methods, lessons learned and recommendations in how to carry out SPI in small and medium sized IT-organizations [25, 26]. In addition, almost 100 refereed publications on related topics have been published, and 3 PhD theses defended as part of the SPIQ and PROFIT programmes.

3 Lessons Learned

Many empirical studies have been conducted in the Norwegian industry as part of these SPI programmes. This section describes the main lessons learned from the point of view of the research managers and the programme manager, that is, the authors.

Lesson 1: It is a challenge for the industrial partners to invest enough resources in SPI activities

The authors were research and programme managers of the two SPI programmes. In our opinion, the perhaps largest practical problem was to keep up the SPI activities within the companies. The performance of a company is closely related to the effort (person-hours) it is willing to spend on the SPI activities. There were several reasons for why many of the companies did not spend as much effort as they initially had planned. Understanding these reasons is important in order to achieve success in an SPI programme. This issue is closely related to the underlying *motives* of the companies and the individual contact persons for taking part in partially externally funded SPI programmes such as SPIQ and PROFIT. A company will ask itself "*what's in it for the company?*" Similarly, an individual will ask: "*what's in it for me?*" We have observed the following motives of a company:

- *Improving its software processes.* As seen from research councils that fund SPI programmes, this should be the main motivation of a company.
- *Increasing the level of competence and knowledge in certain areas.* Although a company is not particularly interested in SPI, it may be interested in using an SPI programme to increase the competence in certain technology areas.
- *Publicity*. Several companies use the collaboration with SPI researchers as a selling point.
- *Be present where things happen*: Even if a company is not genuinely interested in SPI, it may wish to participate in such SPI programmes, just to be present where interesting things possibly happen. The company will not risk to miss information or activities that might be considered important by their customers or competitors.
- *Networking and recruitment*: Connecting to companies, research institutes, and universities has proved a real motivation. For example, since many SPI researchers also teach at universities, they have indirectly been recruitment channels for the companies. The companies are also interested in collaborating with the other companies in the programmes on business issues (in addition to SPI activities).
- *Money*. The Research Council of Norway partially supports the companies' SPI activities.

- *Inexpensive consultancy work*: Some companies have work duties, that are not SPI activities, but which they believe they can use researchers in an SPI program to carry out. That is, they may consider researchers as cheap consultants.

The industrial people in the SPI programmes may also individually have various motives for taking part, amongst others:

- Supporting the motives of the company such as those described above. In particular, supporting the SPI activities of the company.
- Personal interest in SPI activities. This may be the case, even if SPI is not considered important within the company.
- Personal interest in research. This may be the case, even if research is not considered important within the company.
- Increased level of competence in certain technology areas. This may be the case, even if those areas are not considered important within the company.
- Internal status in the company. Holding a high profile and demonstrating a good personal network may increase the status and respect of one's colleagues.

The first two motives of a company are the ones that comply with the research councils' intention of the SPI programmes. Understanding the other companies and the motives of the participating individuals, make it easier for the research partners in the programmes to understand the behaviours a participating company and respond accordingly. Note, that even though the main motivations for taking part in an SPI programme are not the "ideal" ones, the company may still contribute positively to the programme. It is when a company does not contribute to a programme, the underlying motives should be revealed and appropriate actions taken.

Related to the problem of spending sufficient resources on SPI activities within a company, is not only the time of the people involved, but the ability and internal position of the contact persons. To have an impact on the SPI within the company, the peoples should have relevant competence, experience, respect, and position in the company [27]. We have experienced that several companies do not wish to allocate key technical persons to SPI work, because they are considered too important in ordinary business projects (this phenomenon is also seen in collaborative projects, in quality assurance work, and in standardization activities). Therefore, to save costs, the companies let junior or "less important" persons take part in the programmes. As a consequence, the SPI impact within the company is reduced.

Although tailored involvement is required by an organization for successful SPI, it is no precondition for successful *research*. We experienced in SPIQ and PROFIT several cases where data from a company gave interesting research results, although the SPI internal in the company was neglected.

Lesson 2: The research partners must put much effort in getting to know the companies

The impact of an SPI programme does, of course, depend on the resources spent by the researchers, and their competence and enthusiasm. Another success factor is a humble attitude of the researchers towards the situation of the practitioners, and the interest and ability to learn to know the actual company. The researcher should help to solve concrete problems of an organization, cf. action research. For studies where a

deep understanding of an organization and its processes is important, the researcher will gain much goodwill if he or she takes part in some of the organization's regular activities. That is, to give courses, to participate in social activities etc. The presentation of the research results to a company should be tailored towards different roles and needs, and answer "what's important in this study for me".

Another reason to learn in detail about a company, is that such information may be required to identify the kind of companies and contexts to which the results can be generalized. That is, where they are relevant and valid.

Lesson 3: The research partners must work as a multi-competent and coherent unit towards the companies

After seven years of experience, we have learned that a research team for a successful SPI programme primarily must be *competent*. That is, it must cover the relevant technical areas in a convincing manner, e.g. testing, incremental development, component-based development etc. In addition comes knowledge of SPI-related methods, often coupled with insight in organizational science and data analysis. Likewise, the researchers should have adequate industrial experience and insight. E.g. putting fresh university candidates to "improve" seasoned developers is ill-advised, although junior researchers can grow into able assistants, often having ample time to work and familiarize with the practitioners.

The second main issue is that the team must cooperate well internally, i.e. be externally in line. There can and should be tough scientific and other discussions among the researchers themselves, but towards industry, the team should appear as a *coherent* unit. Within a company there are many stakeholders with different interests and agendas in the local SPI effort. The companies are openly reluctant to collaborate with a research team that disagrees on the approach and activities towards the company, simply because it complicates the already complex, local SPI effort even further.

To begin with, the SPIQ and PROFIT programmes were run by four research institutions. Due to internal problems of collaboration, which were partly visible to the collaborating companies, one of the research institutions had to leave the programme after two years. After seven years, the working environment among the remaining researcher institutions is very good. In other words, do not underestimate the time it takes to create a well-functioning SPI research team of a certain size (we have been from 10-15 researchers at any time).

Lesson 4: Any SPI initiative must show visible, short-term payoff

The research community is used to think that improvement actions will have long-term pay off in terms of increased competitiveness, improved product quality, increased competence etc. However, it is often the task of the SPI responsible within the individual company to visualize the payoffs of their investments in SPI. If they fail to do so, it may cause lack of confidence and support from management, which again is an important prerequisite for succeeding in SPI.

For instance, top management in a cooperating company said suddenly that they wanted to release the internal SPI responsible from his tasks, because they could not see that he had delivered the expected SPI results. The management had expected

documentation of a new process model in the form of a printed handbook. The SPI responsible, on the other hand, had concentrated his effort on establishing company-wide motivation for the new SPI initiative and was planning extensive experience harvesting sessions to build the new process description. This had not been visible to the management; instead they saw a large consumption of human resources without any concrete results.

This story shows the importance of being open about the overall process from the very beginning, and to explain how the SPI activities eventually will lead to a worthwhile benefit. Even large companies will not embark upon 5-year SPI plans.

Lesson 5: Establishing a solid baseline from which to improve is unrealistic

The conventional way of thinking about SPI puts generation of new understandings and the associated actions in a *sequential* order, i.e., first understanding, then action. For example, in the early Japanese software factories, a strong emphasis was put on gathering data on existing processes, before changing or improving them [28]. QIP similarly advocates that we should first understand what we do, before we attempt to change it – in line with the Plan-Do-Check-Act loop in TQM.

SMEs face two main challenges with this approach: 1) an ever-changing environment, and 2) few projects running at any given point in time. As a consequence, they have few data, which they can analyze and use to build an understanding. In addition, collected data will soon be outdated and left irrelevant or – in the best case – uncertain. Taken together, this implies that SMEs need to utilize their data as soon as it is available, extract the important information for learning, and engage in expedite improvement actions. There is simply no opportunity to collect long time series or amass large amounts of data, needed for traditional improvement approaches such as TQM's Statistical Process Control.

A specific challenge involves balancing the refinement of the existing skill base with the experimentation of new ideas to find alternatives that improve on old ideas, see again [9]. Since the most powerful learning comes from direct experience, actions and understandings often need to be reversed. Therefore, the generation of new understandings and new actions, in whatever order they evolve, is fundamental to successful SPI. This matches research results from organizational science on combined working and learning, cf. the "storytelling" metaphor in Brown and Duguid's seminal study of the (poor) use of experience bases at Xerox [29].

4 Operational Recommendations

Based on our experiences, we have in the new SPIKE programme introduced the following pragmatic guidelines:

- *Agree on expectations.* In addition to a formal contract between the companies and the programme manager, the mutual expectations among the company and researchers should be clarified in a project plan.
- *Teams instead of individuals.* To ensure continuity, we will for each company co-operate with a team instead of a single contact person. The same applies on the research side.

- *Rapidly identify high risk companies.* If a company tends to show little interest (defers or cancels meetings, does not reply to emails, etc.), we will quickly confront the company with this behaviour. Since our experience is that people do not change behaviour in this area, we will try to replace passive contact persons with more enthusiastic ones.
- *Be flexible upon problems.* Flexibility and responsiveness are particularly important when things seem to be going badly, e.g. when people say they have insufficient time or resources for a task. In such cases we will do things differently, extend deadlines, compromise on the task, offer an extra pair of hands, and so on.
- *Provide timely and accurate feedback.* The real payoff from using data analysis in the organizational learning cycle comes when the data is fed back to the local teams, from which it was collected, and problem solving begins.
- *Picking a good topic ("killer application").* The ideal topic for an SPI programme is locally relevant, based on sound evidence, and able to demonstrate tangible benefits in a short time. Such a focus on small and immediately useful result may, however, not always go hand in hand with the researchers' needs and interests. Our solution is to offer direct payment for extra effort spent on long-term SPI work internally or on results that mostly are relevant to the research community or industry at large. This suggests that SPI programmes should focus both on short-term and long-term alignment of SPI goals with business goals and research objectives. An important challenge is thus to achieve a high degree of mutual understanding of current business objectives, as well as to align long-term SPI goals with business and research strategies.
- *Tailor payment for concrete activities.* The most active companies will naturally get the "lion's share" of the programme resources (i.e. free researcher support and direct payment). In SPIQ we bureaucratically requested that each company got a fixed sum for each finished report, such as an initial project plan, intermediate status reports, and a final report. The experience was that the company felt that writing formal reports did not contribute to the SPI effort of the company. The quality of such reports was also too poor for research purposes. In the following PROFIT, we therefore introduced a flat payment model, where each company was given 100,000 NOK (12,500 €) as long as they contributed with a minimum of activity. Since this model did not stimulate effort over a minimum, SPIKE allows to pay for extra, focused activities. For example, if a company wants to run a controlled experiment on a certain technology, we will also pay the company for the marginal extra effort involved, e.g. 10 employees each working 5 hours à 70 € per person-hour.
- *Tailor payment to those involved.* It is important that the payment is directed to those who actually perform the SPI work. Particularly in large companies, the payment may easily end up a "sink" with no gain for those who are involved. The money should benefit those involved at least at the departmental level. We have experienced that even small incitements can be effective. For example, in one company, we were successful in organizing a lottery where each interviewed person was given a ticket in a lottery where the prize was a hotel weekend in the mountains. In another case, we simply paid each individual 1,000 NOK (125 €) to fill in a questionnaire.

5 Conclusion and Future Work

In the previous section we have outlined some critical factors and lessons learned from the SPIQ and PROFIT programmes.

Some **national-level results** are:

- Many profitable and concrete process improvements in Norwegian IT companies, as well as a better understanding and learning of underlying needs and principles.
- An effective and consolidated cooperation network between researchers and IT industry. This expands a Norwegian tradition for cooperative R&D programmes.
- A fast, national build-up of competence in SPI and empirical methods, resulting in two method books (in Norwegian).
- Upgraded education in software engineering, and many MSc and PhD graduates.
- An extended cooperative network of international contacts.

Some **overall lessons for SPI methods and -programmes** are:

- Textbook methods and approaches to SPI must be fundamentally rethought and down-scaled to be effective in an IT industry with mostly SMEs and a generally high change rate.
- (Inter-)company and long-term learning for volatile SMEs can successfully be organized as a joint effort between companies and research institutions, with proper links to industrial associations and a founding research council. Such efforts must span at least 5 years – in our case 3 times 3 years.
- There should be a close coupling between working and learning. E.g., experience bases and quality systems should be created, introduced, and maintained in a truly collaborative and incremental way [30, 31].

Future work

This paper has described the lessons learned from the point of view of the research managers and the programme manager. We conducted a small survey among the companies to identify their views. They generally seemed happy with the support from the programme, but in several areas the competence and behaviour of the researchers could obviously be improved. One reason for the sometimes low activity in the companies (cf. lessons 1, Section 3), *might* be that the effort of the researchers was not felt sufficiently good. Future work could include interviews with the participants from the industry to identify their real opinions.

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