



Software Process Improvement Case Study



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Process improvements within an IT consultancy company

Overview

Axon IT AB is an IT consultancy company based in Stockholm. The company operates in a wide sphere encompassing three business sectors: Technical Systems, Business Systems and Information & Media. As well as on-site contracts for customers, the company has also, over time, opted to carry out entire development projects in house. Consequently, an efficient software development process is required. Through the SPIRE project, the company has had the opportunity to improve its resource management by means of monitoring, project estimation and skills management.

The improvement process under SPIRE has been a great success, which the management hopes will manifest itself in the completion of an increasing number of projects within the allotted timeframe and resource budget. The time-accounting system devised proved so effective that there are plans to develop it as a product in its own right.

One of the lessons of the improvement project was that it is a good idea to be under external pressure when seeking to improve internal processes. Otherwise, work of this kind tends to receive low priority in smaller companies.

The Organisation and its Environment

Axon IT AB is a dedicated knowledge-based company operating in the IT consultancy sector, in which all consultants possess a computer studies degree or equivalent qualification. Having started as on-site consultants working on customers' premises, as the company expanded we have succeeded in winning contracts to carry out in-house software development projects, in increasing numbers and of increasing magnitude. In these projects we take responsibility for everything from initial studies, specification of requirements and analysis to implementation and training.

The company was founded in 1994 and now has 30 employees and a turnover of around SEK 25 million. On average, turnover has increased by 79% annually since we started trading, and together with our subsidiary Utero Digital Media, we believe we can maintain this rate of expansion well into the next millennium.

To succeed in doing so, we rely on our staff and their expertise. A great deal of time is devoted to continuously increasing and broadening the know-how of our consultants. Employing a consultant from Axon IT is profitable, even though our fees are somewhat higher than those of our competitors.

Axon IT's geographical market is Stockholm and the surrounding area, but we plan to expand into other parts of Sweden in the near future and abroad in the longer term.

The company is currently structured into three business sectors: Technical Systems, Business Systems and Information & Media. The last sector works closely with Utero Digital Media, which is involved in producing multimedia applications, digital marketing and interactive education. The companies share offices in Stockholm city centre.

The software development projects which Axon IT currently runs internally are relatively small, typically involving four or five participants for about six months. Since the company intends to increase the number and size of in-house projects, there will be a need for support and procedures for project estimation, resource allocation and monitoring completed projects. At an early stage, Axon initiated its own quality assurance project, producing a quality handbook in Lotus Notes.

As regards monitoring, the company lacked sufficiently accurate time-monitoring tools. The existing time-reporting system lacked the facility to provide a breakdown of projects by activity level, ruling out any precise monitoring.

Björn Wennerström, quality assurance manager at Axon IT, explained: “Most software manufacturers are still constantly wrestling with the same problem as 20 years ago: getting projects finished on time. To be able to produce reliable project time estimates, we need details of the time spent on many previous projects. The lesson the industry has failed to learn is to make use of the combined experience of staff in a structured manner. Precise monitoring of projects is essential if we are to provide better time estimates.”



Axon's management team.

Since the company is a dedicated knowledge-based company, the management felt a need to find an effective way for all consultants to share their experiences from various contracts with colleagues. An Axon IT consultant should have the entire company's expertise behind him when performing a contract.

The appraisal conducted by the company's mentor showed that the company had an Initial Maturity Level on the CMM scale and that the staff's attitude to improvement initiatives was rated at 5.9.

The management proposed the following improvement initiatives as vital to Axon IT's success in future projects:

- Processes for resource management and monitoring to be devised and introduced. This includes making use of work and ideas from earlier projects.
- Procedures for resource planning, project estimation and risk assessment to be drawn up.
- Skills management to be improved.

These initiatives also involved introducing tools to support the objectives. For some time, the management had felt a

need for a new system for time reporting and monitoring completed projects.

The Improvement Project

Initial stage

Over the six months from April to September 1997, an internal project got under way to devise a new system for time reporting and monitoring. The system was called Checkpoint, and the vision was of a system that would support the project management process, providing company and project managers with detailed information, as well as being a flexible tool for consultants to record their time worked on various projects.

One requirement was that the system should be applicable to all our projects. Projects run on our own account, involving a large number of people, require more detailed project management, with reporting according to activity level, than projects involving a single person providing consultancy services. In the latter case, the customer's own project management systems usually apply.

There were also numerous ambitious plans to produce a range of client programs, including a web interface and distributed solutions for various types of PDA. Because of our stringent requirements regarding the system, implementation had to be postponed.

At the start of 1998, when Per-Ove Agné, our mentor in the SPIRE project, conducted a CMM appraisal of Axon, it became apparent that Checkpoint was one of the priority activities on which the improvement process should focus. SPIRE therefore reinvigorated the Checkpoint project.

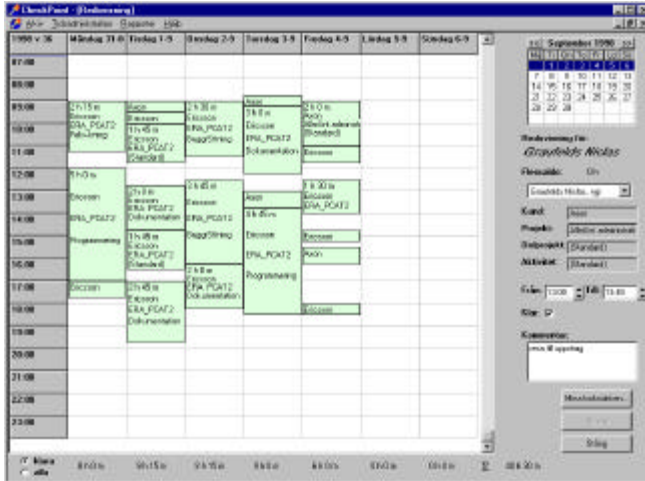
A detailed project plan was produced to ensure that the project would meet its targets. The SPIRE project was divided into three components, of which Checkpoint was the largest in terms of time and scope.

The Checkpoint system becomes reality

Over the summer of 1998 the system was commissioned and incorporated into the project management process. To keep costs down, students on work experience placements were employed to carry out some of the work.

The existing database structure was refined and two types of client were initially developed: a web-based client developed using Microsoft ASP and a more advanced PC client developed in Borland Delphi. To obtain suitable reports from the time database, the Crystal Reports report-

generating tool was used. The system was also prepared for easy connection to new types of client, e.g. Pilot-PDA.



The Checkpoint administration client.

In addition, there were extensive discussions and efforts to devise a process and structure for how time should be reported, what was the appropriate degree of accuracy for time accounting, how long the minimum working period should be, how to carry out suitable monitoring of various types of project, what kinds of reporting were required (looking at it from both the staff and the management point of view) and so on.

Although the project to introduce Checkpoint overran its time slightly, it has proved successful.

Göran Sander, manager of the Business Systems sector, commented: "Checkpoint has provided Axon's management with a tool which makes it possible to monitor very specifically how we are using our time. There's a big difference from the old system, especially as regards the facility to obtain more advanced reports which can then form a basis for planning and monitoring. The ability to use the system via the internet has proved invaluable, because members of the management team are often away from the office. Now, thanks to Checkpoint, they can keep up to date with the company's situation, for example invoicing status and the progress of ongoing projects."

The management of Axon IT is so satisfied with the system that it has decided to investigate whether it is possible to market it as a product.

Resource planning, project estimates and risk assessment

Another component of the SPIRE project involved devising processes for resource planning, project estimates and risk assessment. The working group included several of our consultants with experience in these areas from various on-site contracts for customers.

These processes were introduced during summer 1998 and have already proved useful in a number of projects.

Skills management

This component of the project aimed to devise a new method for all the consultants to share their expertise via a database. The management considered this important, given the rapid expansion of the company and consequent increase in the number of consultants.

The system devised was an extension of the company's existing Lotus Notes system for contract management. After completing a contract, the consultant writes a summary report using a predefined template. These reports are then stored online within a searchable, structured system.

The system is an excellent way for new employees to find out about projects the company has been involved in previously. Consultants requiring assistance or advice for a project can quickly find others with experience of similar contracts.

It is difficult to comment on the impact of the various process improvements on the corporate culture and the working situation of staff. Some employees may think that the new method of recording working time will prove more laborious in the long run, but they may also welcome the degree of monitoring which is now possible.

The Results

As far as Axon is concerned, the SPIRE project has been a success. This was demonstrated when, using the SynQuest tool, we carried out another process appraisal after completing the improvement project. Compared with the results we obtained before the project, our rating has increased by around 50%. Costs were slightly higher than anticipated, but on the other hand the results surpassed expectations.

Martin Forsling, the company's managing director, said: "Axon's customers appreciate our efforts to produce realistic schedules, and Checkpoint has provided us with a whole new way of doing so in a professional manner."



Martin Ohlsson, project manager, commented: "Checkpoint has made my job as project manager a lot easier. Project planning and monitoring arrangements have become much more systematic. For instance, we have new ways of identifying problems at an early stage which might jeopardise schedules."

Niclas Graufelds, a business systems consultant, added: "Checkpoint has made it easier for us to account for our time in several respects. Consultants are required to keep detailed accounts of the hours they work on a project, so previously we had to maintain separate documents with notes on each day's work. The easy accessibility of Checkpoint enables us to keep all our time accounts in a single place, regardless of which customer we are working for. What's more, at any time we can provide the customer with detailed reports on the hours worked."

Lessons

We have drawn several important conclusions from our SPIRE project:

- The external pressure on the project was valuable, because it necessitated project planning and continuous monitoring.
- Involving students on work experience placements requires detailed planning of suitable tasks. You cannot expect students to produce work of the same quality as experienced, fully qualified engineers.

- The ability to monitor the time spent on various projects and activities has already proved very useful in management decisions of a strategic nature.

The success of a project of this kind depends on whether the company's management has a positive attitude and on the project being given equal priority to others. We also advise that improvement projects should be conducted intensively over a short period.

Future plans

Much has improved already, but the major benefits of Checkpoint will not be felt until we have applied the system to a number of projects and built up a database of the time spent on completed projects. We shall then be able to analyse the data and construct a model for estimating the time needed for various project activities. One possibility is to draw inspiration from existing models such as Barry Boehm's COCOMO model, which is based on statistics from a large number of software development projects. In due course we also plan to introduce a standard procedure for assessing the profitability of completed projects.

Additionally, we shall be working on the other recommendations of the CMM appraisal, namely to introduce proper CM tools and a sales support tool at the earliest opportunity.

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