

Measurement Practices in Financial Software Industry

Erkki Savioja^{1*,†} and Markku Tukiainen²

¹ Tietoanator, Helsinki, Finland

² Department of Computer Science, University of Joensuu, Finland



Practice Section

Measurement is practiced in a large number of software organisations. Measurement may have many purposes, e.g. it can have a business goal orientation and software improvement orientation. It is an essential part of the processes in a software company. One of its benefits is that it can be used for customer satisfaction and trust building to show the value creation that quality work has for the customer. Measurement alone will not improve the software process, but it is a necessary step to collect information on the state of affairs and to evaluate the effort in software improvement activities. In this article, we will describe a measurement program in effective use in a medium-size Finnish software company, which combines in its measurement procedures business goal orientation and a dimension of software process improvement from the perspective of engineering processes. Copyright © 2007 John Wiley & Sons, Ltd.

KEY WORDS: measurement; software process improvement (SPI); management

1. INTRODUCTION

The business competition in the software industry has been increasing over the last years by immense measures. The software companies have replied to this development by advancing their profitability, the quality of their products and services, and by customer focus. For software development organisations, this has meant continuous improvement of the practises of producing software and services. Software Process Improvement (SPI) has become one of the major activities practised in software companies on a daily basis (Fenton and Pfleeger 1997).

Software measurement is widely recognised as an essential part of understanding, controlling, predicting and evaluating software development and maintenance projects (Fenton and Pfleeger 1997,

Van Solingen and Berghout 1999, Wiegers 1999) and as a necessary part of any SPI program (Basili and Caldiera 1995, Grady 1997). Measurement is practised in a large number of software organisations, but at the same time many organisations are having difficulties in establishing and maintaining their measurement programs (Goethert and Fisher 2003). This has been largely attributed to the *ad-hoc* nature of the measurement programs, that is to measure everything possible, and not to build the measurement programs onto the goals of organisational development (MacDonell and Gray 2004).

The objectives for the measurement programs are wide and highly dependable on the state and the capability of the company's software processes (Trienekens *et al.* 2005). Measurement activities are considered successful if they help project stakeholders first to understand what is happening during their processes and second, to control what is happening on their projects. Besides these organisational and internal values, there is a benefit of showing the competence of the organisation externally. This increases the organisation's competitiveness in the software market.

* Correspondence to: Erkki Savioja, Tietoanator/Fidenta, Aleksis Kiven Katu 3-5, P.O. Box 428 FI-00101 Helsinki, Finland

†E-mail: erkki.savioja@tietoanator.com



Measurement is an essential part of the processes of a software company, and one of the benefits is that it can be used for customer satisfaction and trust building to show the value creation which quality work has for the customer (The SPIRE Handbook, 1998). Measurement alone will not improve the software process, but it is a necessary step to collect information on the state of affairs and to evaluate the effects of software improvement efforts.

The case presented in this article is the measurement program run in a middle-size Finnish software company specializing in financial software development. This article describes the measurement program run in practice, and evaluates the benefits and downsides of the measurement as given in the following sections:

- Section 2 describes the company and its background for the measurement program.
- Section 3 defines the measurement program from the management perspective.
- Section 4 describes the practicalities of the measurement program.
- Section 5 describes the utilisation of the measures in the company.
- Section 6 draws conclusions on the measurement work done in the company.

2. COMPANY FACTS

The company involved in this case study is Fidenta. Fidenta is a part of the TietoEnator (TE) Group. With over 15,000 employees, TE is one of the largest information technology (IT) service providers in Europe. Like many other similar types of software companies, TE has grown rapidly over the last years mainly by merging smaller companies into itself. This growth has generally occurred abroad resulting in a global software enterprise.

The TE Group has chosen to focus on areas where it originally has had the deepest industry expertise. Globally, the principal business areas are banking, telecom, healthcare and forestry. In these areas, TE works in co-operation with many of the world's leading companies and organisations and TE has been growing with them and is now active in more than 25 countries.

TE is strengthening its international competitiveness by harmonising its operating model, processes and services globally. From the measurement perspective, there are common, TE-group level

measures concerning harmonised processes and individual, business area-related measures for sub-business units.

Continuous improvement is an essential part of TE's process culture. Common measures are based on the experience gained from various countries and customer environments.

The case company Fidenta Oy (Ltd)

Fidenta is the joint venture owned by TE Group and Nordea Bank. The structure of the company's partnership model is described in Figure 1. Fidenta belongs to TE Group and Nordea Bank is Fidenta's only customer. Fidenta operates on TE's banking and insurance area, which is one of the five vertical business areas of the TE Group. Nordea is the leading financial services group in the Nordic and Baltic Sea area. It has been established through many mergers and acquisitions and it started to operate under the name of Nordea from 2001.

The business relationship between Nordea Bank and Fidenta has been built on the basis of value adding partnership. This has been targeted in Fidenta by an arrangement where by the customer has the majority of the votes and TE has the majority of the shares. The fundamental idea is that in this way the customer organisation can concentrate on what they would like the IT to do, while Fidenta makes it possible by taking care of developing the needed innovative IT solutions that accomplish the visions of the customer. Effectiveness of this co-operation is created through a win-win situation, where the foundation is based on close co-operation, the trust in each other and the high transparency between the customer and Fidenta aiming for a seamless end-to-end service chain helping the customer to manage and run its business better.

Fidenta provides systems development, integration, consultancy and application management services as a package tailored to the customer's needs.

Joint venture structure of Fidenta



Figure 1. Joint venture structure of Fidenta



The internationalisation processes of both owner companies have initiated big changes in Fidenta's operational environment and Nordic level working procedures have become a part of Fidenta's everyday life.

Fidenta has done systematic SPI for more than 10 years and the deployed solutions are based on the industry's best practices and utilisation of experience and knowledge inside the company.

The quality assurance thinking in Fidenta has progressed through several phases. To start with, in the mid-nineties quality was identified as the competitive edge for the company. The decision to attempt to attain a quality certificate was made and ISO9000:2000 certificate was achieved in 1997. Then the process-based business model was established with the implementation of a balance score card (BSC) related measurement practices. This phase included a shift from using a quality handbook to quality assurance procedures. During the next phase, a major tool to identify improvement needs and to assess results of improvement efforts was to operate annual external ISO quality certificate follow-up audits. In 2004, maturity issues emerged to the attention of the upper management and since then the **Capability Maturity Model Integration (CMMI)** has replaced the ISO follow-up audits as the essential SPI method. In addition to external assessments, Fidenta has since 1997 executed self-assessments according to **European Foundation for Quality Management (EFQM)** model.

This is in line with the measurement program principles, because the collected data enables an evaluation of the current situation and aligning of development efforts in preferred directions. Utilisation of the best practices is also targeted by the use of process maturity models (CMMI, Software Process Improvement and Capability dEtermination (SPICE)) and other standards (mainly ISO9001:2000). Project manager certificates of International Project Management Association (IPMA) are a part of Fidenta's training program for project managers.

3. MEASUREMENT FROM THE MANAGEMENT PERSPECTIVE

Data collection for the purposes of improvement and performance measures was planned as a part of the advancement of the company's business

system and process descriptions. Measurement results are linked to the annual action planning, e.g. by targeting the effort of improvement actions to particular process areas or processes. The usefulness of measures and how well they fit management needs are evaluated regularly, e.g. in EFQM self-assessments. The fundamental target is that the decisions should be on the basis of facts. To fulfil this target, information is produced through monitoring and measuring current performance and it is utilised in planning and aligning future actions aiming to get preferred changes to happen.

Systematic measurement is also a signal for employees and influences the internal company image. It is expected to be a good signal concerning employee satisfaction level, if management succeeds in convincing the staff that decisions are based on gathered and systematically analysed data instead of intuitive feelings of individual people.

Measurement is a part of the steering and control system of the company. Target levels for measures are set up in the annual action planning process by the Strategic Management Team (SMT), which consists of the managing director, the four business unit managers and the manager of the Consulting Services unit. As a result of this planning, the annual action plan is published in the intranet of the company. The organisation of Fidenta is presented in Figure 2.

Business units are fairly independent of what comes, for example, customer relationship management and how they organise a day-to-day functioning of the unit, e.g. they can decide about training and competence development quite freely within the allocated budget frame. Barriers between units are relatively low and a normal situation is that project groups have members from many units, depending on the need and availability of resources.

Mandatory quality assurance and measurement practices are common to all units, but while they have unit specific action plans and quality reviews they can set their own targets to some measures and analyse results at more detailed levels than the company does. Because of the process-based business model, all units must comply with the core and support processes. Also all SPI efforts are organised at the company level, and units supply resources to internal projects free of charge.

Most of the management measures are created on a monthly basis; some are gathered quarterly, some bi-annually and some annually. Core measures

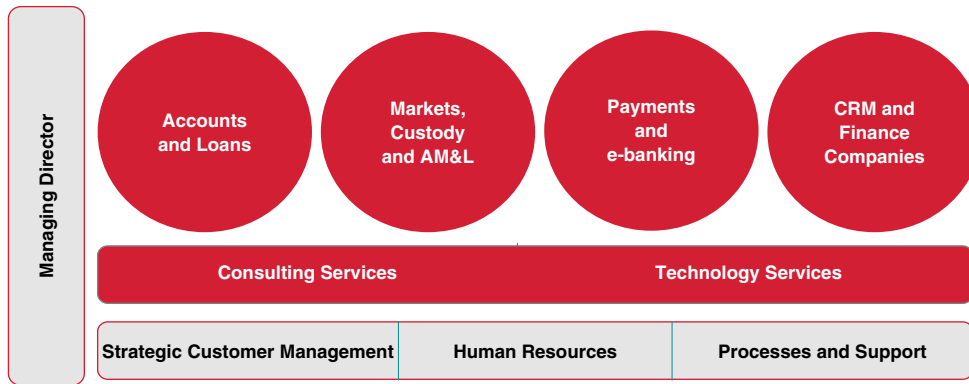


Figure 2. Fidenta’s organisation

are monitored in bi-annual management quality reviews, which are carried out by the Quality Manager in the Development Management Team (DMT), which consists of the managing director, the four business unit managers, the managers of Consulting Services, Technology Services, Strategic Customer Management, Human Resources, Processes and Support units, the Quality Manager and a representative of the employees. Measures are designed annually and new trend charts are created.

Some of the measures are used as an alarm system. Actions are taken only when results deviate too much from the expected ones. If the measurement results are out of expected limits, they set up an analysis phase in order to produce an action aiming to find the necessary corrective steps to get performance back to the accepted level.

Measures are also used for follow-up and monitoring that expected changes in processes have really happened; for example, if some new working procedure has been launched and the management wants to get evidence that the procedure has really been implemented as a part of everyday work procedures. Decisions concerning measurement and quality assurance in general are made by Fidenta’s DMT. Within the launch of harmonised processes, TE has also launched some common measures linked to each process.

From the management’s point of view, one dimension of measuring is also to convince the customers. The company believes that it gets competitive benefits by applying systematic processes. Five to ten years trend values of different measures ensure a picture of stable, effective and reliable partners compared to companies, which could not point out any measurement data of their performance.

4. RUNNING OF THE MEASUREMENT PROGRAM

Measurement results are utilised in software process improvement in Fidenta, i.e. different performance dimensions are monitored through measures in order to make the required enhancements accordingly. BSC (Kaplan and Norton 1996) is used to outline measurement areas as described in Figure 3.

4.1. The Set of Core Metrics for BSC

The following metrics form the set of core metrics used in Fidenta for monitoring and improvement purposes. Each metric is described by giving the name of the metric, and a short description of the metric and how it is measured. The reliability of the results, i.e. the output of the measurement, is given with the company’s internal classification using rates such as very high, high, medium and low.

4.1.1. Customer Area

Name of the metric: Customer benefit index

Description: Data is collected by interviewing representatives of top managements of customers’ organisation. Interviews are conducted systematically by using an enquiry form with 12 questions. Each question has a score, such as monitored over time. Interviews are conducted by the managing director.

Reliability of results: high

Name of the metric: Project feedback

Description: Collection is done by using an enquiry form with 16 questions. Some of the questions require written answers, while the rest need a

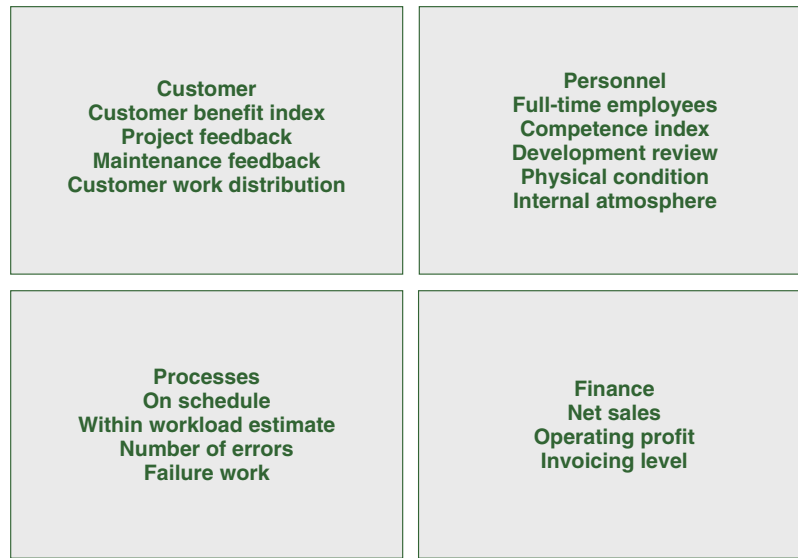


Figure 3. Fidenta’s BSC measures

tick mark in a box. The feedback form is sent to the head of the steering committee and/or 1–2 other stakeholders. All scores are analysed on the project and the sub-unit level; on the company level ‘General evaluation of the delivery’ is monitored

The project manager collects the feedback of his/her project; the Quality Manager creates a company level measure.

Reliability of results: medium

Name of the metric: Consultant feedback

Description: Collection is done using an enquiry form with eight questions. Some of the questions require written answers, while the rest need a tick mark in a box. The feedback form is sent to the stakeholder on the customer side. All scores are analysed by a senior person concerned. On the company level, a ‘General evaluation of the service’ is monitored

The business unit manager collects the feedback of his/her consultant; the Quality Manager creates a company level measure.

Reliability of results: high

Name of the metric: Maintenance feedback

Description: Collection is done by using an enquiry form with 16 questions. Some of the questions require written answers, while the rest need a tick mark in a box. Feedback form is sent to the head of the system area in the customer’s organisation and/or 1–2 other stakeholders. All

scores are analysed by a responsible person and on the sub-unit level, and the company level ‘General evaluation of the service’ is monitored.

A responsible person of the system collects the feedback of his/her project; Quality Manager creates a company level measure.

Reliability of results: medium

Name of the metric: Customer work distribution.

Description: Data is collected from reported work hour files. It is gathered in euros and in hours. It is divided into three categories: development, improvement and maintenance.

Quality Manager is responsible for publishing the measure.

Reliability of results: very high.

4.1.2. Processes Area

Name of the metric: Keeping the timetable

Description: This measure indicates how accurately estimations have been given. It is calculated from planned and actual months between the close and start dates. It is given as a percentage figure. Monitoring is done by the number of projects, the average percentage of keeping the timetable and standard deviation of keeping the timetable. Benchmark data of other TE companies is available for this measure.

Project managers are responsible for reporting of primary project data. Quality Manager creates and communicates the measure itself.

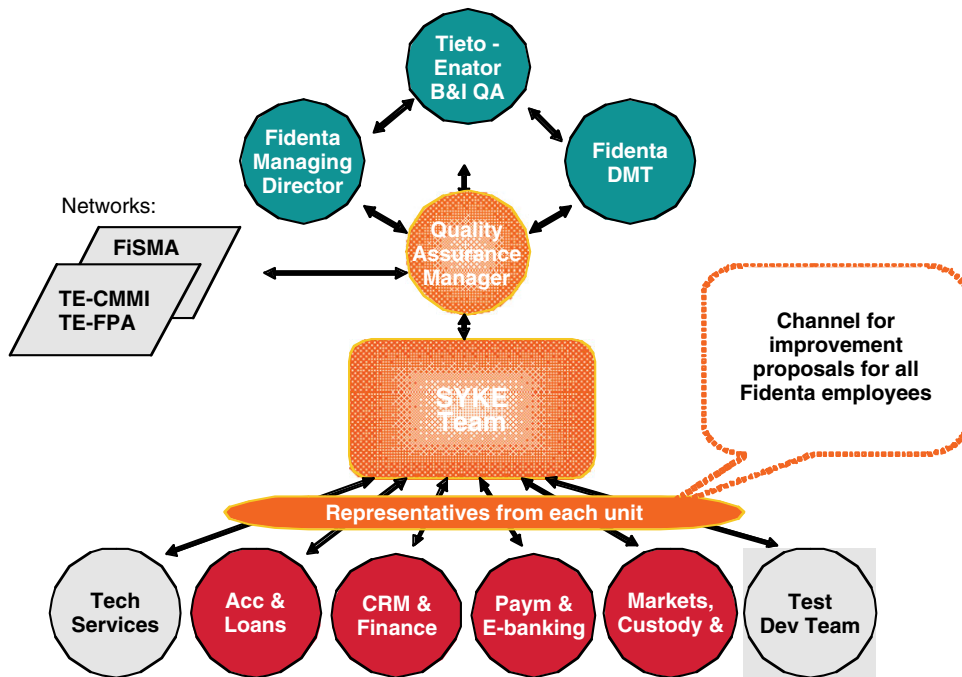


Figure 4. Fidenta's QA organisation

Reliability of results: high

Name of the metric: Keeping the workload estimation

Description: This measure indicates how accurately estimations have been given. It is calculated from planned and actual work hours. It is given as a percentage figure. Monitoring is done by number of projects, average percentage of keeping the workload estimate and standard deviation of keeping the workload estimate.

Benchmark data of other TE companies is available for this measure.

Project managers are responsible for reporting of primary project data. Quality Manager creates and communicates the measure itself.

Reliability of results: high

Name of the metric: Number of errors

Description: This measure monitors the correctness of deliverables. All failures in production classified as programming errors are counted on a monthly basis. Connected to this measure, there is also a percentage of work hours used for correcting production failures and total customer work hours.

This measure has developed positively. It used to get much of the managements' attention, because

it was quite far from the target level. Now it has on an acceptable level for years been.

The Quality Manager creates this measure by picking up a number of failures from the automated production monitoring system and failure hours from the reporting system for work hours. The value of information is not so clear, because the figure is not relative and the scope of information systems concerned is not taken into account.

Reliability of results: very high

Name of the metric: Correction work

Description: This is also a measure of correctness of the deliveries. It indicates the number of work hours used to correct errors in production. Primary data for this measure is collected from the work hour reporting system. All hours used in correction work are gathered in detail at the information system level. And it is monitored by system areas and by information systems. The metric indicates all hours reported in accordance to the rules.

The Quality Manager is responsible for producing this measure and he creates excel tables and charts with the data.

Reliability of results: very high

Name of the metric: Correctness of deliverables



Description: This measure is quite new. Original data is again in the work hour reporting system. Collection is automated. This measure monitors the relational proportion of total project hours, which is used during acceptance testing for fixing the defects. The figure is weighted to the scope of the project.

Employees report their work hours to the invoicing ERP system. The measuring system picks up the data. Reliability depends on how carefully employees have reported the hours they have done. Quality Manager creates the measure by running excel macros and publishes it in the intranet.

Reliability of results: medium

4.1.3. Personnel Area

Name of the metric: Value Creation Capital (Employee satisfaction survey)

Description: Employee satisfaction survey is done annually. It results in many indexes and the Value Creation Capital is the average of seven of them: motivation, goals, competence, authority, organisational efficiency, co-operation and process and good leadership. Research companies also provide benchmark data of other TE units and of the best organisation in the Nordic countries. The survey is done by a research company, which is specialised for monitoring of the internal climate in organisations. The answer rate has always been high (more than 80%). The research has practically been repeated several times with the same procedure

Reliability of results: high

Name of the metric: Full-time employees

Description: The prime data for this measure comes from the eEnterprise Resource Planning System (ERPS), where each employer reports one's work hours. It is created automatically and it is available in Enterprise Information System (EIS).

'Full time employees' is a basic measure, which is used in creating several financial measures at the Group level.

Reliability of results: very high

Name of the metric: Development discussions

Description: The rate of regularly kept development discussions is monitored through this measure. Business unit managers update the database according to the discussions they have had and the Human Resources Unit creates a measure.

The measure is reported in EIS on an annual basis.

Reliability of results: very high

Name of the metric: Efficiency of development discussions

Description: Besides keeping the development discussions, the efficiency of discussions is also monitored. This is done in connection with the annual employee satisfaction survey.

The measure is reported in EIS on an annual basis.

Reliability of results: high

Name of the metric: Competence index

Description: Change of different competences is checked in annual development discussion and they are updated to the competence database.

Reliability of results: high

Name of the metric: Physical condition, well-being

Description: Every Fidenta employee is called to a testing event. The testing takes place every fifth year. Tests are conducted by an external service provider specialised in this kind of testing. Results are reported individually to each person and as average figures on an annual basis for all tests done during the year.

Participation in the tests is voluntary.

Reliability of results: high

4.1.4. Finance Area

Name of the metric: Net sales

Description: The measure is automated by using the ERPS and reported by EIS.

Reliability of results: very high

Name of the metric: Operating profit

Description: The measure is automated by using the ERPS and reported by EIS.

Reliability of results: very high

Name of the metric: Invoiced hours

Description: The measure is a relative proportion of total work hours of the unit. It is counted as a percentage of invoiced customer hours out of the total number of reported work hours.

The measure is automated by using the ERPS and reported by EIS.

Reliability of results: very high

4.2. Other Metrics

Besides core metrics, there are a number of other regularly and systematically measured and monitored metrics related to different BSC fields. Here are some examples of those.



In the customer area Fidenta follows for example, the percentages of project deliveries classified as international and pros and cons of spontaneous customer feedback – collected through customer feedback system integrated to MsOutlook. In the process area the company monitors percentages of hours spent on internal technical support for networks and PCs. Function points of project estimations are also measured.

Employee turnover (outside and inside the group) is measured in the personnel area. So also, the percentages of total hours spent in training employees and absolute number of euros paid out from the company for the training costs. The number of people participating in project management training and in foreign language training is also measured. The number of external consultants belonging to the personnel area metrics is also measured. On the finance area, key figures are followed up per employee, such as the margin of sales, the operating profit, the profit from the sales margin and the costs.

4.3. External Assessments

4.3.1. ISO Quality certificate follow-up audits

Fidenta got the ISO 9000:2000 quality certificate in 1997. It was upgraded to ISO9001:2000 in 2003. The quality certificate requirements are monitored in annual follow-up audits, which have been run as combined CMMI assessments in the last 2 years.

4.3.2. CMMI assessment

Fidenta has carried out CMMI assessments from 2004. The assessments have been CMMI B-type assessment with the continuous set of the model. In assessor teams, there have been three external competent CMMI assessors plus two or three internal TE-CMMI lead assessors. In 2005, Fidenta reached maturity level two, and five processes were on capability level three.

Results of CMMI assessments have been cornerstones for planning and implementing Fidenta's development efforts in 2005 and 2006. The assessment report has been analysed thoroughly by the quality team. The proposal for internal development projects and improvement efforts has been created. The proposal has been presented to the DMT for approval and decision of actual efforts taken.

The focus on choosing development efforts has been on how well they enhance the company's business goal achievements. Model requirements have always been only a secondary cause. According to the improvement roadmap, Fidenta is aiming to get its project and application service management processes on CMMI capability level three. The target is based on the mapping between these core processes of Fidenta and CMMI processes. The roadmap is based on Fidenta's business goals and the analysis of assessment 2005 results.

4.4. Self Assessments

Fidenta has carried out EFQM self-assessment five times from 1997, and the intention is to run it every other year. Fidenta took part in the Finnish quality award competition in 2001, but did not win the service provider series. Scores have improved from about 350 to 511 points.

Assessments have always been conducted by an external consultant specialised in EFQM model to ensure the correct evaluating level. Assessments have been carried out mainly by management group members and a few representatives from different work levels in Fidenta.

EFQM assessments have produced a lot of improvement initiatives, which have been very much in line with other improvement proposals (e.g. CMMI assessments, ISO 9001:2000 follow-up audits). They have been analysed together with improvement proposals from other sources and utilised in the annual action planning process.

5. UTILISATION PROCESS OF MEASURES

5.1. Utilisation Elements and Continuous Improvement

Measures are used for monitoring purposes, to ensure that performance is in line with stated targets. Our approach has been a goal-driven measurement where business goals are interpreted as measurement goals (Goethert and Hayes 2001). In organisation development, the emphases has been on BSC measures, which could be applied through different types of businesses and sub-organisations. Often this has resulted in emphasising the financial and management control-type measurements.

Running the measurement program is considered more profitable for the organisation, while it is



used also in directing the development efforts. It produces data for action planning and creates input for continuous improvement processes. In many cases, there is a disagreement between the developers and managers on how beneficial the measurement activities are for the organisation. In the cases where the developers perceive that measurement practice will have positive impacts on their productivity and product quality, the improvement actions in measurement are well adopted (Green *et al.* 2005).

In Fidenta, the measurement program has been taken up well by the entire personnel. The measurement results are used in many types of situations. For example, the measures for customer satisfaction index and project feedback index are evaluated regularly. Core measures are handled at the quarterly board meeting. In the board, there are representatives of both owner companies and the customer side has the majority of votes.

Fidenta's quality team is a virtual team; the structure of the QA parties is described in Figure 4. The basic role of the QA Team is to be in a two-directional communication channel between management and business unit personnel. There are no full-time members in the team; business unit representatives are shuffled every now and then and the QA Manager is a part-time project manager too.

All employees are encouraged to become familiar with a collection of improvement ideas and encouraged to give their comments. Experience utilisation and learning loop have been identified as important success factors by the company. The quality team analyses improvement data collected from different sources: measurement results, initiatives from personnel through QA Team members, internal and external audits, testing, risk analysis and self-assessments. The process is transparent for employees through the intranet, where proposals and decisions are available. After implementation, effects are evaluated according to a continuous improvement concept.

The main elements of the learning loop are outlined as follows: target setting – action plan – implementation – measuring results.

Target-setting is based on the analysis of the current situation and strategic business goals and it is done by the management team. Development proposals are analysed and the most beneficial ones are accepted into the action plan, which creates a

budget frame for internal development efforts. The action plan is confirmed by the management team.

Implementation is done through internal development projects, which are run as project deliveries in general including planning, monitoring and control. The crucial part of the implementation phase is that results are communicated to the staff so that all employees become familiar with the effects of improvements in the everyday life of the company. Internal development projects are set and results are accepted by the management team.

Results are monitored in biannual quality reviews by the management team, but the main forum to evaluate the results of improvement efforts is the annual external CMMI assessment. Improvement proposals and possibilities mentioned in the assessment report are again a possible input to the target setting for the next year's improvement steps.

5.2. Lessons Learned

According to our experiences, running the measures has had a positive influence in the development of the company. Concerning usage of measures, here are listed some areas where quality practices and measurement results have been used are listed.

Communication

- Open communication, transparent operations of improvement proposals and analysis of assessment results inactivate employees to take the initiative and give impetus to development efforts
- Employees' attitude towards measurement is more positive, when they are aware of the link between improvement in everyday life and measurement
- Management commitment is a must

Benchmarking

- Collection of measurement data enables benchmarking
- Utilisation in customer relationship management
- Motivation effect on internal improvement efforts
- Some measures are common for all units on TE's Banking and Insurance business area, so performance could be compared every quarter to the benchmark data of other units
- Effect on internal company image

Maturity models



- Help to outline development activities; to take more conscious steps towards more capable processes
- Interesting by in 2005, the same needs for improvement efforts came up in both CMMI and EFQM assessments; in these case models two different viewpoints seem to speak the same language (people concerned with self-assessment, mainly managers and in maturity assessment developers, mainly project managers and testers)
- Our experience is that the two dimensions of development sources, business goals and model requirements, are not necessarily very far from each other

Convincing customers/employees

- Company gets competitive benefits by applying systematic processes; long-trend values of different measures ensure customers a picture of reliable partners with good quality functions compared to companies which could not point out any measurement data of their performance
- Logically run measurement also improves employee satisfaction and has a positive impact on the company's internal image

Bonuses

- Some measures, e.g. operating profit and a level of customer feedback have been used as criteria for employee bonuses

System improvement/maintenance criteria

- The company uses the measure 'Percentage of work hours for fixing production errors' while negotiating with the customer about the development needs of a system/application

Virtual quality team

- One experience to share is that credibility is higher, when quality team members themselves do project work; this makes it easier to get acceptance for proposed changes

Analysis on the sub-unit level

- A company level analysis of measures is not enough, because a lot of details are lost. That is why we have spread the analysis on a sub-unit level. Quality team members collect bi-annual quality reviews of their sub-unit and present

them at department meetings. For instance, evaluations for a certain question on project feedback enquiry might be fine at the company level, but some sub-units may not be performing well enough, so it is possible to direct improvement efforts correctly

Worst performing systems

- A list of the 20 worst performing applications was prove to be an effective way to reduce production failures. An unacceptable, high number of working hours used to be spent in correcting production errors instead of project or development work. The action was a weekly meeting with the management and the people responsible for these applications to go through the top 20 worst performers, experiences were shared and needed actions were discussed and it was decided to get the performance on the right track. Desirable effects have been reached and this measure has constantly been improving on an acceptable level ever since.

Efforts needed for measuring

- A measure could be effort consuming to implement, but it must be easy to run

Recruitment

- Measurement practices have on effect on preferred employer opinions; many people interested in working in Fidenta appreciate systematic working procedures, which are indicated by a long-time series of measures

6. CONCLUSIONS

Measurement is practiced in a large number of software organisations. It is considered an essential part of SPI work. Despite this, many measurement programs tend to fail at some point. It has been argued that one of the reasons for this could be the differing opinions about the focus of measurement goals, e.g. towards business goal orientation or software process improvement. In this article, we have described a measurement program in effective use in a medium-size Finnish software company. The connection of business goal orientation and software process improvement from the engineering processes' view point can be



successfully combined (Trienekens *et al.* 2005). This is what has been happening at Fidenta.

One of the interesting future research questions would be how to maintain the improving trend that the measurement program has created. There are the motivational questions of how not to merely maintain the status-quo but to innovatively improve using the measurement data and processes. There is also a question of how to change the measurement practices and methods when the software processes change. There has been some positive evidence of using process modelling with automated tools to integrate measurements into the developing software processes, e.g. application of the Framework for the Modelling and Measurement for Software Processes (FMESP) (Canfora *et al.* 2005).

Another important question for the future is, from the financial point of view, how to get competition benefits out of measurement process in the most effective way.

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