



## A Study of Software Process Improvement in Small Industry

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**ABSTRACT:** *Software Process Improvement is the name given to the identification of the current state of the practice of information systems development within an organization and then improving it. The principle objective of a mature software process is to produce quality products to meet customers' needs. SPI is used to improve organizational capabilities to deliver quality software by defined processes or systematic procedures. Software process improvement always facilitates to identify and apply the changes to current processes so that the new processes can be help in producing the high quality product. SPI is a difficult activity to initiate because of its complex and dynamic nature of processes. One major characteristic of process improvement is to emphasize the continuous improvement of products as well as of organizational processes in terms of performance, stability, compatibility. The author proposed some steps in this paper how we can improve software process.*

**Keyword:** *SPI, performance, quality, process improvement.*

### 1. Introduction

A software process is a set of activities that leads to the production of a software product. These activities may involve the development of software from scratch in a standard programming language like Java or C.

Software processes are complex and, rely on people making decisions and judgments. Because of the need for judgment and creativity, attempts to automate software processes have met with limited success. Computer-aided software engineering (CASE) tools can support some process activities. However, there is no possibility, at least in the next few years, of more extensive automation where software takes over creative design from the engineers involved in the software process.

There is no ideal process, and many organizations have developed their own approach to software development. Processes have evolved to exploit the capabilities of the people in an organization and the specific characteristics of the systems that are being developed.

Software process is a set of activities that begin with the identification of a need and concludes with the retirement of a product that satisfies the need or more completely as a set of activities, methods, practices, and transformations that people use to develop and maintain software and its associated products (e.g., project plans, design documents, code, test cases, user manuals).

Software process performance is the actual results achieved from following a software process. That is, results achieved (performance) differ from results expected (capability).

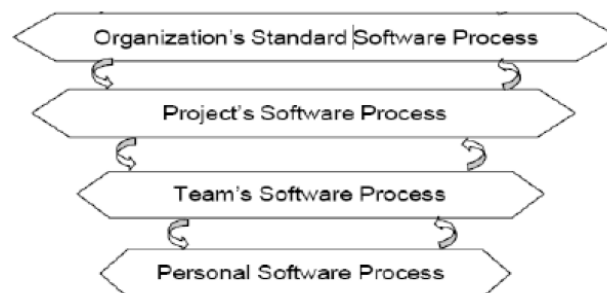


Figure 1: Software Processes

#### 1.1 Individual Processes

This is the basic level of the processes. These processes start as individual process and start moving towards the upper level. It is the foundational level to initiate a process. It is very important to have the good individual processes because these processes become the foundation of the higher level processes. These processes are collaborated with the individuals.

### **1.2 Team Processes**

These processes are formed and maintained at team levels where a number of people work together to combine the individual processes. Team processes also contain roles and responsibilities .

### **1.3 Project Processes**

These processes are formed when a project is started having some specific targets to achieve. Processes involved at this level vary from project to project.

### **1.4 Business Processes**

These are the highest level of processes containing the business visions, business strategies, business objectives and orientation which started from different individual process and end at this level.

### **1.5 Personal Software Processes**

These processes can affect the overall progress and effectiveness of the organization. Improvement and effectiveness in the individual processes can lead towards the overall and aggregate improvement in the organizational performance.

The goal of the PSP is to help developers produce zero-defect, quality products on schedule.

## **2. METHODOLOGY**

### **Basic Steps for Process Improvement**

The opportunity for improvement to either operating or management processes can often be vast, but must be focused. It is imperative that the number of process improvement activities undertaken by an organization is matched by the organization's ability to fund the activity and implement the changes without harmful disruption to day-to-day delivery of its products and services.

The six basic steps for Process Improvement are :

- Process selection
- Process understanding
- Process performance
- Process review
- Process change
- Capturing the change

The objective of Process Selection is to select a small and achievable number of processes, most directly influencing the achievement of the organization's goals and objectives, upon which to undertake process improvement activity. This can take anywhere from a few hours to weeks, be either proactive, e.g. management initiative, or reactive, e.g., customer complaint, and involve one or several people.

Next, comes Process Understanding, covering the scope of the process - where it starts and ends, what is included and excluded. In addition, the key sub-processes and accountabilities of the process to the organization must be understood. These can be achieved by completing the elements of a process - title, purpose, scope, inputs, outputs, controls and resources, and using tools such as process mapping and decomposition.

Process Performance involves recording and detailing the historical performance of the process, obtaining perceptual views of both current and historical performance from customers and suppliers, defining the agreed required performance of the future improved process, and agreeing how it will be measured, monitored and reviewed. Data must be gathered and analysed -this can be accomplished via several means, including observation, counting, workshops, interviews, and questionnaires.

Process Review, the data and information that has been collected and analysed is reviewed and recommendations made for the improved process. Several tools, such as Cause and Effect, Pareto and Force Field Analysis can be used in this step.

Process Change translates the prioritised process improvement mandates into an integrated programme of continuous improvement or process re-design activity. Detailed project plans with milestones, objectives, performance measures and targets, benefits, roles and deliverables must be developed, as well as a plan to manage the change and train all necessary personnel in the new process. Once the previous five steps have been implemented it is essential that the improvements that have been achieved are sustained.

In the final Capturing the Change step, the process improvements are integrated into the business management system, ensuring the change is reviewed, managed and built upon. Procedures should be written for the improved process, the changes, improvements and benefits communicated to all stakeholders, any training conducted, and the process and procedures regularly audited.

## **3. CONCLUSION**

The Software Engineering Institute writes on their homepage that the vision software organizations try to attain is "The right software, delivered defect free, on time and on cost, every time". A structured set of activities required to develop a software system specification, design and implementation, validation and evolution. Software process capability describes the range of expected results achieved from a software process. But capability is not the same as performance.

Software process improvement always facilitates to identify and apply the changes to current processes so that the new processes can be help in producing the high quality product.  
Through these steps we can improve the software process and quality.

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