

# Organizational Change Management Principles and Practices

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**Abstract.** This paper identifies essential principles and practices that help an organization to accept change. These practices identify how to establish, execute, monitor, and measure a change effort that will benefit software development organizations and their customers. In addition, the practices are classified into two groups corresponding to those practices that must be successful and those that should be successful. In some cases, specific methods are described for successfully performing a practice.

## 1 Introduction

Currently, the software industry has adopted many software process standards, requirements, and guidelines, such as the CMM [1], CMMI [2], and ISO [3], [4]. Each of these standards advises organizations what they should do, but they do not tell organizations how they should specifically do them. Furthermore, they address process improvement simply as a technical problem, although the social aspect is probably the primary factor of every change effort. Simply stated, cultural barriers can significantly hinder a software process improvement program or prevent it from succeeding. Consequently, the primary purpose of this paper is to identify principles and practices fundamental to changing the way an organization manages change. An organization can use these principles and practices to train change teams and evaluate the organization's ability to adopt change.

## 2 Principles

There are four key principles underlying organizational change best practices.

*Principle 1: Business processes must support business needs.* Every process should increase organizational value by supporting the business vision and supporting strategies. To do otherwise would lower the utility of a change effort and would place it at risk because it probably would not gain the necessary organizational support to make it successful.

*Principle 2: Staff an organization with people that can successfully support and execute the business processes.* The support of management personnel at multiple levels of an organization is critical to the success of a change effort. This is because their positions give them the ability to motivate others to adopt change, through various mechanisms, and lead their staff in accepting change. In addition, personnel most directly affected by change must exhibit several traits and skills that permit them to effectively adopt change. Such traits include intelligence and integrity, among many others.

*Principle 3: Plan change efforts to maximize return on investment and minimize risk.* Successful change is the direct result of planning. The planning process must identify the effects of a change, the benefits of a change, the barriers to change, and alternatives for infusing change within an organization.

*Principle 4: Measure process and product quality.* The measurement of process and product quality permits an organization to determine its rate of change, which it can use to evaluate the success of a change effort. It also permits an organization to compare the rate of actual change against its planned change, and to allocate resources based on the gaps between actual and expected progress.

### 3 Practices

Twenty-four organizational change management practices support these four principles. These practices fall into four primary groups: those that help to establish a change effort, those that affect the execution of a change effort, those that assist the monitoring of a change effort, and several other general practices.

#### 3.1 Establishment Practices

Six key practices support the successful establishment of organizational change.

*Practice 1: Align the goals of a change effort with organizational strategy.* An organization's strategic plan identifies the products and services it delivers and the core business and key supporting processes that help deliver these products and services. It also identifies the organization's special competencies and how they enhance the core and key supporting organizational processes. If the goals of the change effort do not support the organizational strategy then the change effort will not yield significant value to the organization. Therefore, by aligning the goals of a change effort with the business strategy of an organization, the change effort will have a greater chance of succeeding because the change effort will receive greater executive commitment than if the goals were not aligned. In sum, the commitment of executive level management (see Practice 2) validates this practice.

*Practice 2: Acquire and maintain executive commitment.* Great leadership is required for change to occur, especially if the change requires significant cultural changes. Thus, corporate leaders must provide this leadership by committing to change, communicating the corporate vision to others, and empowering people to act consistently with the behaviors of the change. To accomplish this, the organization must clearly define its structures, management systems, and guiding principles, policies, and procedures. Furthermore, executives must take the time to communicate the vision to all of the organization's employees in small groups of ten or so people. If management shows this kind of commitment, then the employees will know that it is serious about the change.

Contrast this to most communication efforts that occur once from management to practitioners. Instead, a continuous, iterative dialog between management and practitioners should occur. For example, most executives generally write a one-page description of the required change and express support for it. As a result, the message that these executives send to employees is clear – the change is worth fifteen minutes of my time and no more. Contrast that to what the CEO of IBM did when he wanted IBM to produce personal computers. He spent six months communicating and justifying his vision to small focus groups within the company [5]. Thus, executive commitment will influence the behavior of the entire organization and make it more willing to adopt change. An auditor can identify whether executives are committed to a change effort by verifying that executives continually meet with practitioners in small groups.

*Practice 3: Create and maintain a superior change team.* To create a superior change team an organization must first define a charter that identifies a task that is narrower in scope than the organization's strategy statement and states the expectations of management in terms of goals and metrics. These goals and their descriptions must not change during the change effort, and there should only be a few of them. The change team must control the goals, which must be measurable and meaningful.

The change team must also define its purpose, the methods and procedures it will use, what is acceptable team behavior, and how it will resolve conflict and define team roles. The change team must derive milestones from project goals that represent intermediate states that it must achieve. The change team must control the number of milestones so that each one occurs at useful intervals. When defining milestones, the change team should ignore the activities that it must perform to achieve them. Later, it will specify how it will achieve its goals.

Creating a superior change team requires more than good planning; it also requires good people. To enact change, change team members should be experts and stakeholders, have positions of authority, possess good management and communication skills, and have the ability to focus on the change vision and objectives. Change team members should also be analytical, creative, insightful, and open-minded.

In closing, a superior change team will effectively create a plan for change, identify processes to change, and acquire support for the change effort from an organization, at all levels. Unfortunately, there are no

practical verification methods for this practice, other than to subjectively decide that change team members have the desired characteristics. Thus, the quality of such verification is highly suspect.

*Practice 4: Evaluate the willingness of the organization to change.* The readiness of an organization to change is dependent on several variables, including the strength of the corporate culture and the number of prior change efforts. In stronger cultures, adoption of change will be more difficult. If there have been several recent change efforts, acceptance of change will also be more difficult. If recent change efforts have largely failed, the next change effort will be extremely challenging. Consequently, if any of these situations exist in an organization, change will take much longer and will require much more effort on the part of an organization, its leaders, and change team.

To achieve a successful change, a change plan must rigorously identify the objectives and milestones of the change, the impact of change on the workforce, the cultural climate, the barriers to change, methods for overcoming them, the probability of overcoming them, the communications approach, and the required training needs. If an organization does not clearly identify these organization aspects and the change approach, the change effort will probably fail because the organization has not adequately planned how it will introduce the change into the organization and how the organization will sustain the change. In sum, planning for change will maximize return on investment and minimize risk.

Verification of this practice is largely subjective. People can evaluate documents written by upper level management, evaluate their behaviors relative to the change effort, evaluate the success of past change efforts by interviewing software engineers employed by the organization, and evaluate the emotional readiness of the staff towards new change efforts similar in nature to the one the organization is proposing.

*Practice 5: Change teams must be the instruments of change.* Process owners should be sponsors of change teams to insure their full commitment to change efforts. Senior line managers, such as division heads, should be sponsors of change efforts and the main points of continuity. In addition, highly respected members from various business functions of an organization should be members of change teams to encourage cross-functional changes, which have the greatest payoff, and help establish buy-in among the workforce. The commitment of process owners and senior line management will initiate a successful change effort and the full representation of the various business functions by members of the change team will help sustain it. The change team, however, has the greatest chance of sustaining a change if it periodically communicates with those affected by a change.

*Practice 6: Plan for continuous improvement.* Continual process improvement will cause an organization to produce better products more reliably and efficiently and enhance customer satisfaction and value. To achieve continuous improvement, an organization must use good performance measures and management must monitor them and respond to them, as necessary. In addition, auditors should verify that the selected metrics are accurate measures of business goals.

### **3.2 Execution Practices**

Seven key practices support the successful execution of organizational change.

*Practice 7: Articulate an extremely compelling need for change.* When an organization decides it wants to change, it should assess its current state and clearly identify its desired state. Afterwards, it should identify the differences between the two states and estimate the difficulty and required effort of moving from the current state to the desired one. The greater the gap between the two, the more important the identification of a compelling need. An extremely compelling need for change will encourage others to embrace the change and increase the odds of a successful change effort. Since compelling needs usually must support business needs, auditors should verify that the documented needs support the business goals and that they are compelling.

One way to establish a compelling need is for organizational leaders to change first and then continue to adhere to the desired behaviors. One way to make a case for a compelling need is to compare an organization against its competitors and other best-of-breed organizations. Often, the survival of an organization is the compelling need for change [5].

*Practice 8: Select processes to change based on those having the greatest expected return on investment and the lowest expected risk.* There are four kinds of processes of strategic importance. The most important type of process is an identity process, which defines the basic purpose of an organization. For example, the identity process for Jet Propulsion Laboratory is to explore space. For a commercial software vendor, it might be to develop a software infrastructure to support business enterprise computing. The next most important kind of process is a priority process, which directly and significantly affects everyday performance. For JPL, priority processes are to develop spacecraft, data analysis software, and robotic vehicles. For a commercial software vendor, it might be to enhance its database product, develop middleware products, and develop application solution frameworks. Still lower in importance are background processes, which are necessary for an organization to survive in the long term. Typical background processes are human resource and institutional computing functions. Finally, the least important processes are mandated processes, which an organization must perform because of government or other regulations. When an organization seeks to change itself, it should change those processes most vital to it. Selecting processes based on this scheme yields the greatest value to an organization. Auditors should verify that change teams perform risk/reward trades by inspecting artifacts that document them.

*Practice 9: Change at most three processes during a change effort.* When an organization attempts to change more than three processes, the change team often becomes confused about the goals and objectives of the effort. If the change leaders have difficulty grasping such dramatic change, consider the problems that the organization's personnel will have understanding it. The change team should document the processes it proposes to change in a change plan, which auditors can later validate.

By adopting a strategy of gradual change characterized by several minor changes, an organization's personnel can better cope with the change effort. In addition, adoption of this practice by an organization has the added benefit that its personnel will learn to live with change, which helps it to continually learn and improve. Such change will maximize return on investment and minimize risk.

*Practice 10: Create a vision for each process to be changed.* The organization must develop a vision for each process it expects to change. The process vision must describe the new capabilities of the process and the expected performance improvements. Further, it must identify how the organization will support the strategy, respond to customer needs, and respond to competition. The new vision must include measurable objectives for each new process that illustrate dramatic improvement, and fact-based analysis must drive the vision. The change team should document the vision for each change process, which auditors can later examine.

By creating a vision for each process undergoing change, the change team can provide the members of an organization with a sense of how they will perform work in the future. This will lower resistance to change by allaying fears that arise when people are uncertain about their futures. This will help to increase return on investment and lower risk.

*Practice 11: Develop an "as-is" understanding of the processes to be changed.* A change team must understand existing processes to identify areas of improvement, to estimate how much an organization can improve, and to measure improvement. It must obtain a detailed understanding of the processes chosen for change so that it can communicate the required organizational and behavior changes to affected personnel. Getting a realistic view of the "as-is" state allows the team to identify important activities, involved people, required resource levels, and existing controls. This understanding helps the change team create a migration plan and a performance baseline. Later, auditors can verify this practice by examining the migration plan. Adhering to this practice increases the probability of success by lowering risk.

*Practice 12: Understand the risks and develop contingency plans.* There are two types of risk involved when changing an organization: technical and organizational. One technical risk is that an organization will change a process and it will not work as intended. Another technical risk is that while an organization is implementing a change process, it will disrupt ongoing business to such an extent that it may harm its relationships with important customers. Regardless, the greatest risk to a successful change effort is a cultural reaction against the change. One way to fight the negative reaction against change is to have the change team thoroughly, effectively, and truthfully communicate the change effort to the members of the organization. Retraining is one way to prepare the organization for such a change, as well as to help align its infrastructure. Probably the best way to mitigate risk is to implement change through pilot efforts that demonstrate success. By identifying risks and planning to overcome them, an organization will have more

success. Lastly, auditors can examine the risk management plan of a change effort to determine whether an organization has made contingency plans based on a sufficient understanding of the risks.

*Practice 13: Follow software assessments and project postmortems with planned process improvement programs that eliminate or minimize noted problems.* Following software assessments and project postmortems with process improvement has two benefits. First, it reinforces management's commitment to improvement, which helps overall organizational commitment. Second, it helps to improve product quality and personnel productivity, which results in higher staff morale and increased customer satisfaction. Thus, action plans should follow software assessments and project postmortems, which auditors can later validate and evaluate for effectiveness.

### 3.3 Monitoring Practices

Five key practices support the successful monitoring of organizational change.

*Practice 14: Select and use appropriate metrics.* Metrics should measure the desired characteristics of a change effort. This often means that an organization must discard old metrics and replace them with newer ones. If an organization continues to use old metrics that do not accurately reflect the goals of the desired state, the organization will have difficulty transitioning to the desired state.

The benefit of using appropriate metrics is that they will measure how the performance of an organization compares to the desired state. Such measures, therefore, should indicate the progress of a change effort towards the desired change goals. The change team should document the metrics in a change plan, which auditors can later examine for appropriateness.

*Practice 15: Perform annual process assessments and benchmarks.* Annual process assessments help to identify areas for process improvement, whereas benchmarks help to identify where an organization stands relative to an industry. Each assessment and benchmark provides a snapshot of an organization's capabilities, which should be the basis for determining whether it needs to change and the value of such change. Auditors can easily determine whether an organization performs assessments and benchmarks by verifying the existence of reports documenting their execution.

*Practice 16: Continually measure the productivity of personnel and the quality of software artifacts.* Continual productivity and quality measurements help to identify organizational problems, whether they are process, cultural, or motivational in nature. By performing these measurements, an organization can identify where and when a failure in process or people occur, which allows an organization to analyze the failure in a focused manner and rapidly take corrective action. Auditors can easily verify that metrics are collected and that they measure product quality and personnel productivity.

*Practice 17: Analyze an organization's software portfolio, which is the total number of applications it owns.* A portfolio analysis should include counting the number of copies of each application, examining the status of each application in terms of defect levels, and identifying the overall importance of each application. The highest level of importance indicates that an application is critical to the success of the enterprise's missions. In addition, an organization should know the role each application plays in the future of the enterprise.

By understanding the software tools that an organization uses and their degree of use, an organization can identify those areas that have the greatest need for tool support, as well as where it can derive the greatest benefit from tool use or change. Such understanding should also influence the training activities of an organization.

*Practice 18: Conduct postmortems of software projects.* Project postmortems are internal assessments of a project performed by project personnel at the end of a project. Consequently, they tend to lead to the adoption of new practices or processes that enhance product quality or personnel productivity. The purpose of such meetings is to analyze the strengths and weaknesses of the defined software processes.

Auditors can verify that an organization performs project postmortems by examining documentation, such as meeting minutes. They can also verify that an organization takes action based on an assessment of these reports.

### 3.4 General Practices

Six key practices support the successful implementation of organizational change.

*Practice 19: Instill in the organization a commitment to change.* To obtain a commitment to change within an organization, a proposed change should be consistent with past changes and people must see that management is committed to the change. That is, people should not feel that managers would abandon a change when another fad comes along. Probably the most important thing to achieving change in the workplace is to hire resilient people, which allow them to absorb high levels of disruptive change while displaying minimal dysfunctional behavior. Resilient people are positive, focused, flexible, organized, and proactive. Therefore, this should be a core personnel management strategy. However, the adaptability of an existing workforce depends more on its current state and the context than on any intrinsic resilience. Thus, whenever an organization hires many new people, it must face significant issues of cultural integration.

*Practice 20: Communicate effectively.* Communication is the most effective tool an organization can use to obtain acceptance of a change. Such communication should be face-to-face since passive participation (e.g., written memos) typically does not demonstrate the necessary commitment. Communication must also occur frequently and the organization should encourage its executives, middle-level managers, and software engineers to initiate such change.

An organization can perform several actions to foster positive change. First, leaders should listen to others in a way that encourages them to understand the benefits of a change effort. Second, the organization should understand how the new work environment differs from the old one. That is, the change team must compare and contrast the future vision with the previous one and past change efforts. Third, individuals must learn how the change effort will specifically affect them. Fourth, the person given the responsibility of communicating the change effort to an organization should be the head of a large business unit, if not the entire organization. All these efforts help build trust, and management providing regular feedback enhances this trust. In sum, effective communication will help the workforce better understand what the change is, the motivation for the change, and how it affects them. Such understanding will help the workforce to accept the change.

*Practice 21: Top-level executives should stay actively involved.* Active involvement may include chairing executive steering committees, presiding over reward ceremonies, continuing to communicate in large and small forums, and visibly adopting required behaviors of the change effort. By staying actively involved, top-level executives demonstrate their support of a change, which will help it to succeed.

*Practice 22: Listen to the customer.* An organization must capture the needs and desires of its customers since their perceptions of its strengths and weaknesses are vital to its success. That is, an organization should ask its customers what it must do today to satisfy them two, three, and five years in the future. Since customer input helps to improve the products an organization develops and the processes that most importantly address their concerns, auditors should examine that documentation exists that verifies that the organization obtains and uses customer feedback on a periodic basis.

*Practice 23: Align the infrastructure.* Successful change requires that an organization align its human resource, information, financial, organizational, and other support systems around the core business processes. Organizational structure, for example, should be an operational response to an organization's mission and strategy. Thus, the reporting relationships among an organization's business units should represent its actual workflows. In addition, when an organization asks people to perform new functions, it should help them establish and develop the necessary competencies by providing appropriate training. If an organization does not do this, old practices will render new organizational changes meaningless and a business's operating units will not function more efficiently or effectively. Thus, it is vital that auditors identify the workflow between business units, identify whether the organization's infrastructure matches it, and whether personnel within those business units have the skills to effectively and efficiently perform their work.

*Practice 24: Foster a creative and innovative environment.* Organizations must systematically and deliberately identify new ideas and ways of doing things better. This requires organizations to challenge the basic assumptions on which its organization and industry has been built. To change these assumptions requires creativity, which is the generation of ideas and alternatives, and innovation, which is the

transformation of those ideas and alternatives into useful applications that lead to change and improvement. To be able to adapt to change, to create, and to innovate requires that management be able to accept, test, and validate these ideas, as well as give recognition to both the successful and unsuccessful ones. An organization must always challenge assumptions, create solutions, and look at problems from different perspectives. This kind of environment is always more open and amenable to improvement. As a result, auditors should subjectively assess how experimental an organization is when conducting business.

#### **4 Critical Practices**

To succeed with a change effort, such as software process improvement, an organization must successfully perform several critical practices. Failing to successfully perform any of the critical practices will mean that the change effort will fail. The most important critical process is obtaining executive-level commitment for a change effort. To obtain executive-level commitment, a change team must successfully accomplish several tasks. First, it must demonstrate specifically how the change effort supports the organizational strategy and business needs. For example, if the addressed business need is to reduce manufacturing costs by 10% then the change effort must demonstrate how it will help to reduce manufacturing costs. Second, it must demonstrate a beneficial financial return on investment.

Unfortunately, most software process improvement efforts attempt to demonstrate the value of the effort in measured terms of lowered number of defects, increased productivity, and shortened schedules. The problem with this approach is that these measures are difficult for managers, especially high-level executives, to translate into financial value. Worse, no simple measure is provided that permits these decision-makers to compare a software process improvement effort with another competing program. In addition, these measures do not provide a means for determining whether the rate of return is greater than some minimal level that the organization expects to obtain from every investment. This is what most software professionals forget – a software process improvement effort is an investment! Therefore, if an organization has determined that it wants a return of 8% on every investment then a software process improvement program must convincingly demonstrate that it will achieve at least an 8% return. If not, it will not be able to acquire or sustain a commitment.

The most sophisticated, and most appropriate, model for computing return on investment is the discounted-cash-flow model because it considers the time value of money [6]. That is, it discounts future cash flows to their present values. To use this model, one first assumes some minimum desired rate of return, set by an organization to cover risk and the cost of money and then calculates the rate of return, as specified by the model. If the sum of the discounted values of future cash flows is greater than the payout then the project is viable; otherwise, the project costs more than it returns. For every viable project, the excess of the present value over the payout indicates its merit, which an organization can use to compare one proposal with another. This, of course, assumes that there is a limitation of funds and that all beneficial proposals compete with one another.

To perform such a computation, the people proposing a software process improvement effort must translate defect and productivity improvements into financial terms. They also must prepare initial defect and productivity rates and costs based on other organizations. It is best to use data from within the same industry or from those who work on similar problems. Then, the proposal team should consider revising these rates and costs based on cultural and personnel issues. Beware that an organization's executives will expect justification for the proposed expected defect and productivity rates and costs.

Another critical practice is constructing the vision of the new organization, as well as for the individual changed processes. Unfortunately, this is seldom addressed by software process improvement plans nor discussed by software process improvement professionals. This is somewhat strange considering that modern software development processes usually specify the development of a concept of operations [7], [8], which essentially outlines the vision of a proposed software development system. So why is it that software process improvement professionals think that they can create a new system – a software process – without doing what they themselves advocate to software practitioners? Thus, develop an operational concept and support it with several operational scenarios.

A third critical practice is communicating the change effort – the vision, its benefits, its differences, and so on – to the entire workforce. The change team will have to do this for executives, middle-level managers, and practitioners. For each group, the change team will have to develop a different message.

For high-level executives, the message will concentrate on the alignment of the change effort with the business goals and needs of the organization and the financial return on investment. For practitioners, the message will emphasize the difference between how they do work today and how they will do it in the future. The change team should emphasize the personal benefits of the change, and emphasize tedious operations they currently have to perform manually that will be automated in the future state. Finally, the change team should motivate middle-level managers by emphasizing the benefits in terms of improved product quality, reduced schedules, and greater predictability of schedules. That is, the change team should emphasize that managing projects will be easier in the new state than in the prior one.

## **5 Summary and Conclusions**

This paper has identified four organization change management principles, which are vitally important to organizing change. Further, it has identified twenty-four practices for changing an organization. When the author first realized that there were major cultural barriers to software process improvement, he found little published work in the software engineering or information technology fields. He, therefore, sought ideas in the organizational management arena and found many [9], [10], [11], [12]. When appropriate, the author adopted these ideas as suitable practices for infusing improved software processes into organizations.

Consequently, organizations should adopt these change management principles and practices based on their business needs. To promote success, an organization should address the three identified critical processes – achieving executive commitment, creating a vision of the future organization, and communicating that vision to the organization. In addition, a select group of people, having the necessary skills and personal characteristics, should lead software process improvement efforts. In conclusion, software process improvement initially starts as a reaction to a perceived or real problem and should grow into a proactive search for better ways of developing software.

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