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**Strategies for Successful Six Sigma Implementation**

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**Abstract:** *The paper deals with common grounds for problems occurring in the implementation of Six Sigma programs and presents useful strategies for a successful implementation. Ways for planning and preparations, as well as needs for pilot studies and business analysis are discussed. Important activities and issues to be considered at the development of Six Sigma programs are described. Different ways for implementation are compared and pros and cons are discussed. In addition, the paper introduces a model embracing five phases for the implementation of Six Sigma in any organization. The concept is first introduced, after which it is tested and adapted by means of pilot projects, then in order to be implemented widely in the organization. Finally, the Six Sigma program is gradually expanded and integrated in the daily work.*

**Key Words:** Six Sigma, Improvement program, Quality improvements, Implementation

## **1. Introduction**

Many companies are implementing improvement programs based on the Six Sigma concept. The intentions are often ambitious and the expectations of good results high. Experiences show, however, that many of these efforts are not too successful. There are even companies that have withdrawn their Six Sigma initiatives or considerably reduced their involvement as a consequence of shortcomings and difficulties.

The paper is based on the authors' long experience with consultation and training in Six Sigma and similar improvement programs in many companies and other organizations, as well as on research work performed at the Royal Institute of Technology in Stockholm, Sweden.

## 2. Common problems at the implementation of Six Sigma

There are many pitfalls and problems that can occur at the implementation of an improvement program according to Six Sigma. The authors have through practical experience and studies identified some of the most crucial problems that can risk the outcome of such an approach. (Sandholm & Sörqvist, 2002), see Figure 1. Other studies and papers have pointed out similar important areas ( see e.g. Antony & Banuelas, 2002, Goldstein, 2001 or Rath & Strong, 2003).

- *Top management is not dedicated and involved.*
- *Top management does not serve as a model and does not show its conviction.*
- *Midle management is not involved and will become resisters.*
- *The need for resources is underestimated.*
- *Lack of driving forces among managers and personnel.*
- *Selecting wrong people to lead and drive the improvement work.*
- *Insufficient or too short training programs.*
- *The need for dealing with attitudes and resistance to change is overlooked.*
- *Wrong Six Sigma projects, often too large, are selected.*
- *The improvement work is not linked to the company's strategies and goals.*
- *The adaptation to the company's culture and situation is lacking.*

Figure 1. Common problems that can negatively influence the Six Sigma efforts.

## 3. Planning of and organizing for implementation

An important first step is to carry out a *preparatory study* in order to get information on improvement work carried out, present need for improvement, specific wishes and attitudes among managers and staff. Usually this means that interviews of managers and staff members have to be carried out. It is also suitable to analyze the company's costs of poor quality. This gives strong arguments for an ambitious approach. Based on this a Six Sigma program adopted to the situation and needs can be developed (see below).

Another important element is to set up a *specific organization* for the planning and carrying out of the implementation (Rath & Strong, 2003). The work should be carried out as an extensive project reporting to top management. It is of great importance that the necessary resources are available. In order to create good conditions for success, it is necessary to involve people with experience of Six Sigma and the implementation of improvement programs. This often means that a support from experienced consultants might be necessary. Benchmarking companies practicing Six Sigma successfully is a good approach.

Clear visions and goals for the implementation should be developed and informed about. A *communication plan* should be developed in order to present unanimous arguments and facts regarding the scope, importance and implementation of the Six Sigma program (Snee & Hoerl, 2003). The relation to the overall strategies and goals of the business has to be made clear.

Another part in the preparation for the implementation is to identify *indicators and measures* in order to verify that the Six Sigma implementation follows the plans and goals set up. Such measures can be the number of Black Belts, Champions/Sponsors and Green Belts trained, the number of Six Sigma projects launched and carried through, the average number of projects per staff member and the total return of completed projects. In addition, it is suitable to carry out a systematic *risk analysis* of the implementation in order to identify and prevent possible problems and deficiencies.

#### **4. Structuring a company's Six Sigma program**

Six Sigma is not a standard. Successful Six Sigma programs can differ considerably. This shows that every company has to develop and adopt its program so it will fit the company's situation and needs. According to the authors, this is a strength of Six Sigma as the improvement program will be tailor made for the own business. Important considerations, when developing a Six Sigma program, are (Sörqvist, 2004):

*A. The overall leadership of the Six Sigma program.* It is important to decide on who will run the Six Sigma work and how this will be done. The authors' experience is that this has to be done by top management, in particular during the implementation. A visible commitment and a strong prioritization of the improvement work by top management will drastically influence the outcome.

*B. Establish role structure and work descriptions.* A basic structure including Champions/Sponsors, Black Belts and Green Belts exists in principle in all Six Sigma programs. In addition, a number of other roles can exist depending on the size of the business and the organization, as well on aims and maturity. The complete role structure has consequently to be determined and a clear work description with responsibility and authority for each role has to be developed.

*C. Survey needs for competence and plan training activities.* The necessary competence for each role has to be specified and appropriate training activities have to be worked out or procured. For some of the Six Sigma roles, for example Black Belts, there are standardized courses available, while for others it has to be worked out.

*D. Select individuals fit for the roles.* It is important to have adequate people in the different roles in the Six Sigma organization. Particularly important is that operational managers actively work as Champions/Sponsors, that people with great aptitude and good status are selected as Black Belts and that a person with great influence and commitment is designated as the owner of the Six Sigma program in the executive team.

*E. Methodology for problem identification and prioritizing.* In order to be able to continuously launch new Six Sigma projects and to insure a good outcome from them, it is necessary to establish a systematic procedure for identifying possible improvement projects and for prioritizing and selecting which projects to carry out primarily. In the beginning it is usually rather simple to find relevant projects. The better the business becomes, the more demanding this work becomes, at the same time it becomes more important to carry out projects that contribute most to the success and the profitability of the business.

*F. Systematic approach for project control, follow up and reporting.* Procedures on how to run the Six Sigma program have to be developed. These include among other things templates for project terms of reference, project plans, final reports, as well as procedures for the control and follow up of projects in progress.

*G. Determine criteria for measuring result and success.* Procedures for the verification of results and successes have to be developed. If possible, financial controllers should be involved in the verification work.

*H. Develop reward schemes and create motivational programs for individuals.* The existing procedures, systems and criteria for rewards, promotion and payment have to be revised so that Six Sigma work will be stimulated and supported.

*I. Internal marketing and promotion.* Means for highlighting and visualizing the Six Sigma work, its results, good examples and good contributions have to be developed.

*J. Systematic approach for exchanging experiences, competence development and propagating success stories.* Utilizing experiences and knowledge achieved, as well as communicating these to future Six Sigma projects is of great value. Specific procedures for this have hence to be developed.

## **5. Three ways for implementation**

The implementation of a Six Sigma program can be done in different ways. The most common ways are a complete implementation at the same time in total business, a gradual implementation and an implementation through developing an existing approach. The way to be chosen depends on several factors. Crucial factors are top management's support and commitment, level of ambition, attitudes in the organization, as well as existing improvement work.

*1. Complete implementation.* A complete implementation means that the implementation is done at the same time in the entire organization. This way is often practised by large American companies. The implementation starts with kick-offs, massive promotion and a comprehensive training program, as well as top management's involvement in selling the program internally.

This way for implementation gives great visibility. The program and its vision is easy to make clear. The personnel feel the importance of the improvement work through the scope of the efforts and top management's active involvement. Resources are more easily insured as the work is driven from the highest level. Significant results will rapidly be achieved as a consequence of the massive efforts.

There are, however, several disadvantages with a complete implementation. This way is relatively risky. Everything is staked on one card. If the implementation fails, it will be very difficult to start over again. Top management's support is extremely critical. Without a top management being deeply involved in the improvement efforts and where the individual managers choose to commit themselves, this way is not to be recommended. The complete implementation requires accordingly a drastically change of priorities among top management.

*2. Gradual implementation.* A gradual implementation means that the implementation is done by stages. One starts with a few areas and then increases gradually. This way is safer. The need for resources and support from management is not that large as at a complete implementation. Furthermore the chances to gain resources and management support through a successfully implemented improvements that set free resources and create confidence. A gradual implementation is easy to start as the needs for preparations, planning and resources are less.

This way, however, has some drawbacks. As a gradual implementation is less clear, it is more difficult to gain the necessary attention and support. As it is easy to start on small scale, the planning of the improvement work as a part of work can be lost. Improvement coaches, managers and staff members are expected to carry out these new activities beside the ordinary work. The risk of conflicts of time and resources is considerable. The time of getting results is longer, why the need for patience is great.

*3. Implementation through developing an existing approach.* If a company already has a strong and well established way to carry out improvements and business development, there are strong reasons to implement Six Sigma by extending this present procedures. Some companies have chosen to carry on with Six Sigma as a part of a larger improvement program where also other concepts as Lean Production and Kaizen exist. Other companies have carried on and proceeded to Six Sigma.

An advantage of proceeding from a present structure is that the implementation will usually be simpler.

## **6. A model for implementing Six Sigma**

In order to get a successful implementation of Six Sigma, various demands on the business are made. In practice this means that the implementation will done in several well-thought out stages with the aim of refining and developing successively (see Figure 2).

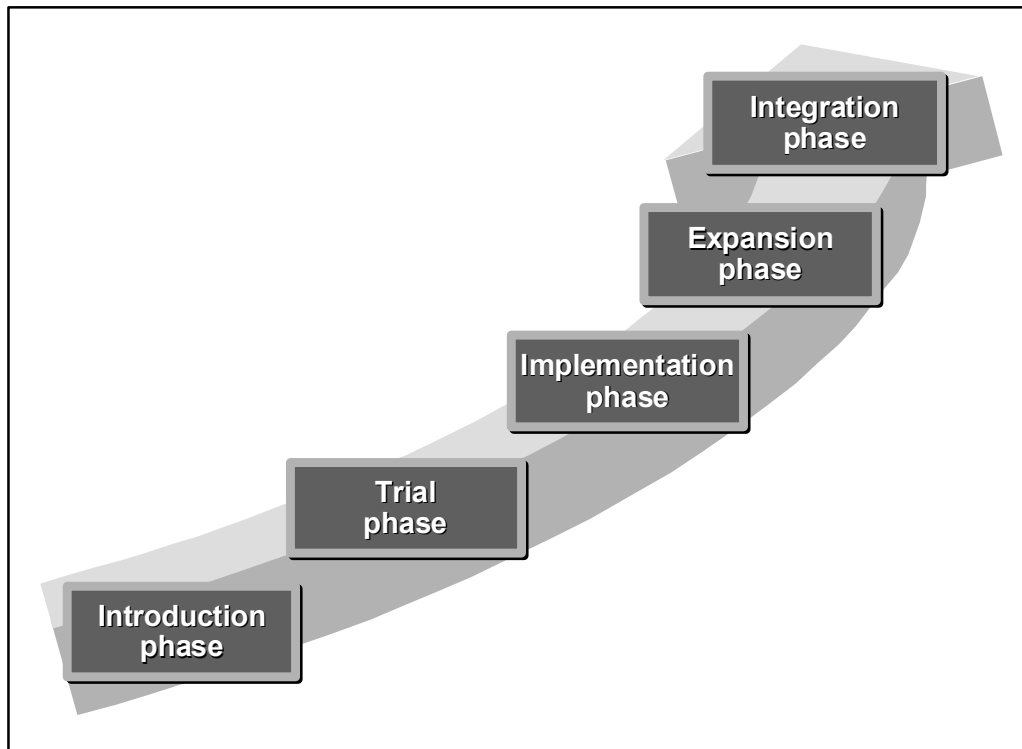


Figure 2. Implementing Six Sigma in five phases.

## 6.1 Introduction phase

The aim of the introduction phase is that management and other key personnel will get understanding of the need for an effective improvement program according to Six Sigma and knowledge of how such a program should be shaped. The objective of this phase is to decide on that the business will implement a Six Sigma program. Another important aspect of the introduction phase is that the Six Sigma work will get support among managers.

An important major element of the introduction phase is to carry out a management seminar describing the Six Sigma potential, examples of successful companies practising Six Sigma and how an effective Six Sigma program should be shaped.

The introduction phase will create the interest and understanding necessary in order to launch the program. It is, however, not enough for the consecutive work. Additional training of management, as well as intensive coaching of management is in most cases necessary in the consecutive phases of the implementation.

An important basis for the introduction phase could be a preparatory study. Knowledge of the problems of the business, preferably in the form of data on costs of poor quality (Sörqvist, 1998), is often a useful argument when convincing a doubtful management of the importance of implementing a Six Sigma program. Benchmarking successful businesses is also of great value in this phase.

## 6.2 Trial phase

The trial phase includes starting a couple of pilot projects where the Six Sigma methodology is applied, often with an intensive external support. The aim is to learn more, to develop and adopt the Six Sigma program to the situation of the company, as well as to have some good examples to be used in order to create the involvement among management and staff necessary when later implementing Six Sigma broadly.

It is important to design the Six Sigma program according to the situation and the internal culture of the organization in question (Blakeslee, 1999). The trial phase gives a good opportunity to test and learn more in order to be confident in the approach chosen. The phase can be considered as a pilot test.

Experiences show that there is a need for a "critical mass" of successful improvements in order to have good conditions for the implementation of the improvement program. The extent of the "critical mass" depends on the maturity of the organization, as well on the ambition of the implementation. The pilot projects selected should be projects that will rapidly and easily give visible results and effects.

In the trial phase an intensive training program is launched (Sandholm, 2005). The people selected for the Six Sigma roles must be given the knowledge and skills necessary. To start with it is important to train Champion/Sponsors and Black Belts, as their support is necessary in developing the program. These training activities may well be integrated in the early projects carried out.

The length of the trial phase can vary depending on the maturity of the organization, available resources and the scope of the program. It can be from a couple of months to several years. It is recommended, however, to intensify the work as much as possible, as this shows that the program has high priority. Hence it will be easier to implement. A realistic time frame, if management is dedicated is four to six months. A common way to shorten the time is to make use of external consultancy support. Figure 3 shows an example of an intensive trial phase.

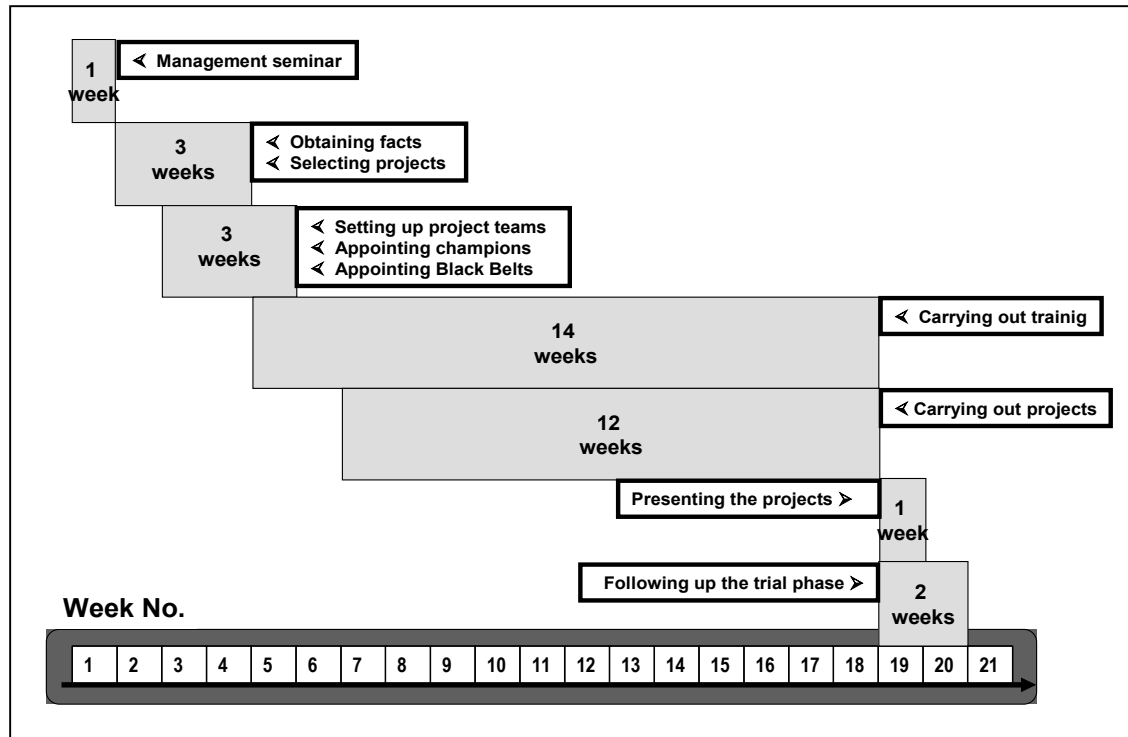


Figure 3. Example of an intensive trial phase used at consultancy work carried out by Sandholm Associates.

During the trial phase, it is advisable to start informing and training personnel. The improvement program is highlighted in the company magazine, discussed at ordinary meetings, described on the intranet, etc. Green Belts are selected and trained.

The trial phase has to be organizationally planned, managed and controlled. At this stage the organization is probably not accustomed to working with improvements, why that there is a obvious risk this work is not giving priority to in favour of daily work. The improvement work must be continuously followed up. Deviations must be handled in a prompt way. All successes have to be verified and documented, experiences are collected in a systematic way.

### 6.3 Implementation phase

When enough experience has been gained and a well-working model for the Six Sigma work has been developed and tested, it is time to implement it. Before that an evaluation should be made in order to find out if the organization is mature for this. Is there an adequate support and involvement from management? Have necessary resources been given? Does personnel have positive attitudes to the improvement work? Is the level of ambition realistic? If one is doubtful, the trial phase should be prolonged in order to get the necessary confidence through additional successful projects. This is important as there will normally not be a second chance if the implementation fails.



The implementation has to be well planned. Activities of vital importance must be decided on and be prepared for. All permanent roles in the improvement organization must be filled. These staff members will be trained and time made free for their new activities. Management and other key personnel will be trained so that they will understand how they shall act in order to support the improvement work. A number of improvement projects will be selected and launched. Staff members assigned to improvement teams will be trained.

According to the previous discussion, the implementation can be done in different ways. In some cases it is done as a complete implementation in the entire organization, in other cases as a gradual implementation. It can also be done as an extension of already existing program or concept.

## 6.4 Expansion phase

When a Six Sigma program is implemented and in operation, there will be much more to do. Experience shows that the early phases of a Six Sigma implementation often have a focus on the internal work and particular on the production work. The implementation will then proceed to an expansion phase. This means the Six Sigma program will be successively enlarged to include the entire business, supporting processes and product development included. The focus on external customers is increased. Major suppliers are involved in the improvement work (se Figure 4). Such an expansion can take several years.

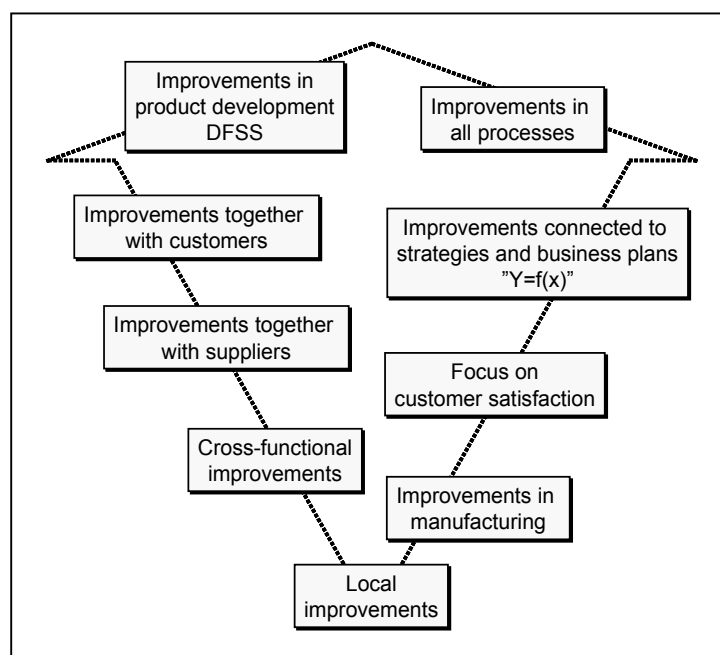


Figure 4. Frequent stages in the expansion of the improvement work.

## **6.5 Integration phase**

The last phase of the implementation is the integration phase. The aim is to establish Six Sigma so it will become an ordinary part of all work. This is done by systematically integrating the improvement work with the ordinary work. Important is then to influence the internal culture and the way people think and act. Consequently this is a long process that requires participation and patience.

A common stage of this change is that there will be a transition of the business to a more process oriented set-up. This is a good condition for an effective improvement work. Process owners have a cross-functional responsibility. It will then become more obvious to optimize processes considering the customer needs. Many conflicts and potential sub-optimization can be avoided. Permanent cross-functional improvement teams can be set up.

A common experience is that the pace of the improvement work varies in a cyclic way. Frequent successes seem to sometimes create satisfaction that can lead to stagnation. The setback will then cause a reawakening. Improvement programs carried out under strong trade names tend to become out of date. An important part of this phase is then to continuously keep Six Sigma alive and at a high level. It seems that a program lasting for 5 to 7 years often needs some form of comprehensive revitalization or change in order not to become stagnant.

## **7. Conclusions**

There is today no doubt about that Six Sigma can give excellent results. Unfortunately, it is not quite easy to implement an effective Six Sigma program in a business. Many implementing Six Sigma are not successful in reaching the goals set up. By a careful preparation and planning of the Six Sigma implementation, the probability of success will increase. The authors have found that the five-stage model presented in this paper is very useful as a basis for this work.

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