

CHAPTER 3

RESEARCH METHOD

3.1 Six Sigma Management

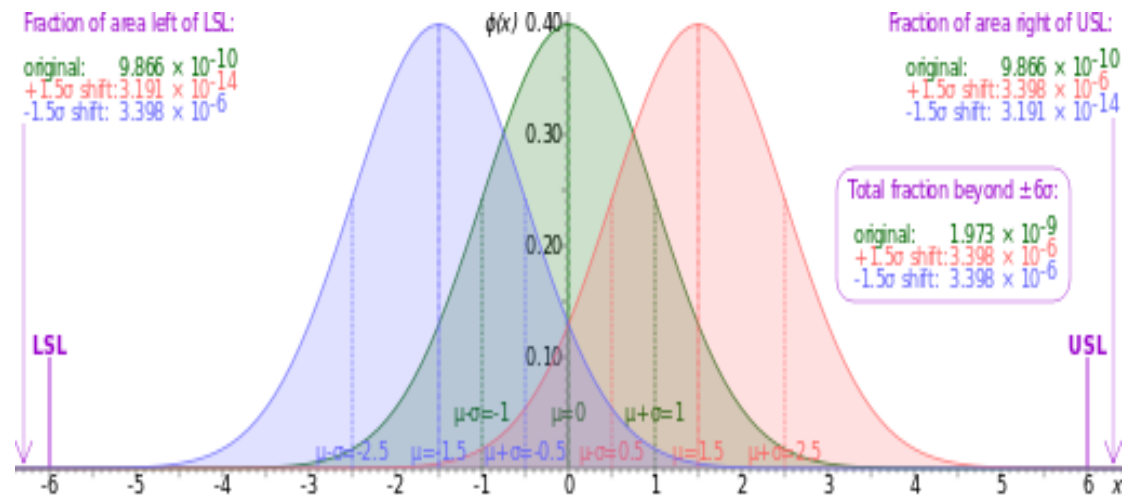
3.1.1 The definition and concept of Six Sigma Management

3.1.1.1 What is Six Sigma

The concept of Six Sigma (6σ) was proposed by Motorola's Bill Smith in 1986. This concept belongs to the category of quality management. Sigma (Σ , σ) is a Greek letter, which is a unit in statistics and represents the standard deviation from the mean value. The production process can be calculated using “Sigma”, which calculates the percentage of non-defective products in the product.

If DPMO is 3/4 million, that is, a 99.99966% pass rate, this is called Six Sigma. DPMO (ie, defect rate per million samples) refers to the chance of a defect within 1 million chances. In other words, Six Sigma means that 99.99966% of the products produced have no quality problems (3.4 defects per million).

Chart 3 - 1



Graph of the normal distribution, which underlies the statistical assumptions of the Six Sigma model. In the centre at 0, the Greek letter μ (mu) marks the mean, with the horizontal axis showing distance from the mean, marked in standard deviations and given the letter σ (sigma). The greater the standard deviation, the greater is the spread of values encountered. For the green curve shown above, $\mu = 0$ and $\sigma = 1$. The upper and lower specification limits (marked USL and LSL) are at a distance of 6σ

from the mean. Because of the properties of the normal distribution, values lying that far away from the mean are extremely unlikely: approximately 1 in a billion too low, and the same too high. Even if the mean were to move right or left by 1.5σ at some point in the future (1.5 sigma shift, red and blue), there is still a good safety cushion. This is why Six Sigma aims to have processes where the mean is at least 6σ away from the nearest specification limit.

The table below gives long-term DPMO values corresponding to various short-term sigma levels.

Chart3 – 2

| Sigma level | Sigma(with 1.5σ shift) | DPMO | Percentage defective | Percentage yield |
|--------------------|---|-------------|-----------------------------|-------------------------|
| 1 | -0.5 | 691,462 | 69% | 31% |
| 2 | 0.5 | 308,538 | 31% | 69% |
| 3 | 1.5 | 66,807 | 6.7% | 93.3% |
| 4 | 2.5 | 6,210 | 0.62% | 99.38% |
| 5 | 3.5 | 233 | 0.023% | 99.997% |
| 6 | 4.5 | 3.4 | 0.00034% | 99.99966% |

3.1.1.2 What is Six Sigma Management

The 6σ management method is a statistical assessment method. The core is to pursue zero-defect production, prevent product liability risks, reduce costs, increase productivity and market share, and increase customer satisfaction and loyalty. Six Sigma management focuses on product and service quality as well as process improvement. From the above we can see that " σ " is a Greek letter, used statistically to represent the standard deviation value, to describe the degree of deviation of the individual from the mean, the measured σ represents such as unit defects, 100 The probability of 10,000 defects or errors, the greater the value of σ , the fewer defects or errors. 6σ is a goal. This quality level means that in all the processes and results, 99.99966% is almost flawless, that is to say, doing 1 million things, of which only 3.4 are defective, which almost approaches to the most perfect realm humans can achieve.

In terms of its management implications, it generally includes the following three layers of meaning:

1. It is a quality measure and a goal to pursue.

2. It is a set of scientific tools and management methods that use DMAIC (improvement) or DFSS (design) processes to design and improve processes.
3. It is a business management strategy. Six Sigma management is a process innovation method that reduces the operating cost and cycle while improving customer satisfaction. It is a management method that enhances the profitability of the organization by improving the operating quality of the organization's core processes, and also competes in the new economy. Strength and continuous development ability of business strategy.

Six Sigma management concerns the process, especially the core process that provides value to the market and customers. Because the process capability is measured by σ , the larger σ is, the smaller the fluctuation of the process is, and the stronger the process is with the lowest cost loss, the shortest time period, and the ability to satisfy customer requirements. The 6σ theory believes that most companies operate between 3σ and 4σ , which means that every million operational errors are between 6210 and 66800. These defects require the operator to make up afterwards with sales of 15% to 30% of the funds. Or amend, and if you do 6σ , the funds made up afterwards will be reduced to about 5% of sales. It is worth noting that the 6 level is the ultimate goal of quality. However, for the average organization, it is not easy to achieve 6-level for each Six Sigma project, especially for those companies with low quality or those who have not been operating for Six Sigma. Achieving 3 to 4 quality levels is a very good achievement, which is enough to enable companies to significantly reduce costs, rapidly increase their competitiveness, and obtain satisfactory returns. This is the near- and mid-term goal of Six Sigma management. To achieve the ultimate goal of quality, we should learn to enjoy the results of each stage of project management, and gradually move forward.

3.1.2 Process and implementation procedures of Six Sigma Management

3.1.2.1 Process of Six Sigma Management

The Six Sigma model is a top-down approach to innovation that is led and driven by top corporate executives who propose improvements or innovations in goals, resources, and time frames. The implementation of the Six Sigma mode can use an improved process consisting of DMAIC. The DMAIC process can be used for the following three basic improvement plans:

1. Six Sigma product and service realization process improvement.
2. Six Sigma business process improvement.
3. Six Sigma product design process improvement.

This innovative approach emphasizes the use of quantitative methods and tools, emphasizing the detailed definition and quantification of satisfaction with customer needs. Each stage has clear objectives and is aided by appropriate tools or methods.

3.1.2.2 Implementation procedures of Six Sigma Management

I Identifies core processes and key customers

With the expansion of the company's scale, customer segmentation is increasingly intensified, and products and services are more standardized. People's understanding of the actual work process becomes increasingly blurred. Obtaining a clear understanding of existing processes is the first step in implementing Six Sigma management.

1. Identify the core process. The core process is the most important department or operation to create customer value, such as attracting customers, order management, loading, customer service and support, developing new products or services, billing collection processes, etc. They are directly related to customer satisfaction. Correspondingly, processes such as financing, budgeting, human resource management, and information systems are subsidiary processes that support the core processes and are indirectly related to improving customer satisfaction. Different companies have different core processes and answer the following questions to help determine the core process:

- (1) What are the main activities of the company to provide products and services to customers?
- (2) How exactly are these processes defined or named?
- (3) What are the primary outputs used to evaluate the performance or performance of these processes?

2. Define key output and customer objects for business processes. In this process, as much as possible, it is necessary to avoid stacking too many projects and work products under the "export" column so as not to cover up the main content and to lose focus on the work. For a key customer, it is not necessarily an external customer. For

a process, the key customer may be the next process. For example, the key customer of the product development process is the production process.

3. Draw the core flowchart. On the basis of identifying the main activities of the core process, the main activities of the core process are drawn into a flow chart so that the entire process can be seen at a glance.

II Defining customer needs

1. Collect customer data and develop customer feedback strategies. Without a clear understanding of customer needs, it is impossible to successfully implement Six Sigma management. Even the internal auxiliary departments, such as the human resources department, must clearly understand the internal customer-company employees' demand conditions. The key to building a customer feedback system is:

(1) Treating the customer feedback system as an ongoing activity is regarded as a matter or center work that should be prioritized for a long period of time.

(2) Hearing different reflections from different customers cannot be viewed in a partial manner due to the special cases that are particularly impressive.

(3) In addition to regular customer feedback methods such as market surveys, interviews, and formalized complaint systems, new customer feedback methods such as customer rating cards, database analysis, and customer audits are actively adopted.

(4) Master the development trend of customer demand.

(5) For customer demand information that has been collected, in-depth summary and analysis should be conducted and communicated to the corresponding senior management.

2. Develop performance indicators and requirements descriptions. Customer needs include product requirements, service requirements, or a combination of the two. For different needs, performance indicators should be separately formulated. For example, in the packaging food ordering process, service requirements mainly include user-friendly ordering procedures, pre-notification services after shipment, and customer satisfaction levels after receiving goods. Product requirements mainly include: According to the time required to ship, use the prescribed transport tools to ensure that the product integrity. A requirement description is a concise and comprehensive description of the product and service performance criteria in a process.

3. Analyze and rank customers' different needs. Confirm what are the basic needs of customers, these needs must be met, otherwise the customer will definitely not produce a sense of satisfaction; what is the customer's variable demand, the better

done in this type of demand, the higher the customer's evaluation rating; which It is the potential demand of the customer. If some characteristic of the product or service exceeds the customer's expectation, the customer will be in an overjoyed state.

III Evaluate current behavioral performance against customer needs

If the company has strong resources, it can perform performance evaluation on all core processes. If the company's resources are relatively limited, it should start with one or several core processes to conduct performance evaluation activities. The assessment steps are as follows:

1. Select assessment indicators. There are two criteria: ①These evaluation indicators are available, and data can be obtained. ②These evaluation indicators are valuable and are of concern to customers.
2. The operability of the assessment indicators is defined so as to avoid misunderstandings.
3. Determine the source of the data for the assessment indicator.
4. Prepare to collect information. For a sample survey that requires performance evaluation, a sample selection scheme needs to be developed.
5. Implement a performance evaluation and test the accuracy of the assessment to see if it is worthwhile.
6. Through the analysis of the errors reflected in the evaluation results, such as defective product rate and defective product cost, identify possible improvement opportunities.

V Identify priorities and implement process improvements

Differentiate the processes that need improvement, find high-improvement opportunities, and prioritize improvements. If you do not determine the priority, companies can use various aspects to disperse their energies and affect the implementation of Six Sigma management. Business process improvement follows a five-step cycle improvement approach, namely DMAIC mode:

1. Definition. The definition stage is mainly to clarify issues, goals, and processes. The following questions need to be answered: What issues or opportunities should be focused on? What should be achieved? When did you reach this result? What process

is being investigated? It mainly serves and affects which customers?

2. Measure. The evaluation stage is mainly to analyzing the focus of the problem, using key data to narrow the scope of the problem, finding the key reasons leading to the problem, and define the core of the problem.

3. Analyze. Through the use of methods such as logic analysis, observation, and interview methods, the causes of the problems that have been evaluated have been further analyzed to confirm whether there is a causal relationship between them.

4. Improvement. A number of options for improvement are drafted. Through discussion and consultation in various aspects, the most ideal improvement plan can be selected and put into practice. The implementation of Six Sigma improvements can be a partial improvement of the original process; in the case of more existing process problems or greater inertia, it is also possible to re-engineer the process and introduce new business processes.

5. Control. According to the pre-determined control standards in the improvement plan, various problems that arise during the improvement process are solved in a timely manner so that the improvement process does not deviate from the pre-determined track, and a large mistake occurs.

VI Expanding and Integrating Six Sigma Management System

When a Six Sigma management improvement program achieves the goal of reducing defects, it becomes crucial to consolidate and expand the success of this victory.

1. Provide continuous assessments to support improvement. Widely publicize and promote this improvement program within the company to gain wide recognition of the company's management and employees, to reduce the resistance to further improvement; to implement the improvement plan into easy-to-understand texts for easy implementation; and to implement continuous assessments. Corporate management and employees are encouraged and confident in the results of the assessment; any improvement plan may have areas for further improvement, and strategies for dealing with potential problems should be formulated in advance and ready for further improvement.

2. Define process owners and their corresponding management responsibilities. The adoption of the Six Sigma management method means breaking the obstacles to the

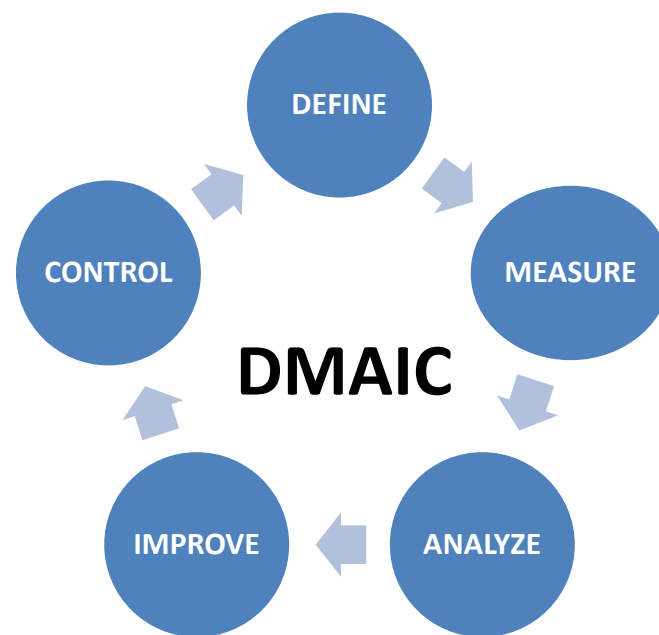
divisional functions of the original department. In order to ensure the efficient and smooth flow of various business processes, it is necessary to designate the person in charge of the process and clarify its management responsibilities, including: maintaining process documentation, evaluating and monitoring process performance, identifying possible problems and opportunities in the process, and starting and supporting new ones.

3. Closed-loop management was implemented and the Group continued to promote Six Sigma performance. Six Sigma management is a process of repeated improvement. The five-step improvement method needs to be used repeatedly in practice to form a closed-loop system with sound development, continuously improve the quality management level and reduce the defect rate. In addition, the management of Six Sigma starting from some core links also has a process of gradually improving the results and expanding the scope of improvement from point to point. According James R. Evans.; &William M. Lindsay. (2005) suggested that Six Sigma relies on the participation and teamwork of employees at all levels-from the lines to top management.

3.1.3 Six Sigma Management Based on DMAIC

The theoretical core of the Six Sigma management method is the DMAIC process improvement model, and all activities are mainly centered on DMAIC. Every stage of DMAIC process improvement is supported by powerful data statistics, using scientific methods and methods to reduce process defect rates, eliminate deviations, and improve process capabilities. The DMAIC project methodology has five phases:

Chart3 - 3



- Define the system, the voice of the customer and their requirements, and the project goals, specifically.
- Measure key aspects of the current process and collect relevant data; calculate the 'as-is' Process Capability.
- Analyze the data to investigate and verify cause-and-effect relationships. Determine what the relationships are, and attempt to ensure that all factors have been considered. Seek out root cause of the defect under investigation.
- Improve or optimize the current process based upon data analysis using techniques such as design of experiments, mistake proofing, and standard work to create a new, future state process. Set up pilot runs to establish process capability.
- Control the future state process to ensure that any deviations from the target are corrected before they result in defects. Implement control systems such as statistical process control, production boards, visual workplaces, and continuously monitor the process. This process is repeated until the desired quality level is obtained.

The Six Sigma management solution is based on the DMAIC process. It covers the planning, organization, human resources preparation and training, implementation process and evaluation, application and management of related technology methods (including hard tools and soft tools) for Six Sigma management.

3.2 Project Management

3.2.1 Definition and concept of project management

The project is a temporary activity organized by the organization. It uses pre-determined resources within a pre-defined period of time to produce a unique and pre-definable product, service or result.

Project management is the project manager. Under the constraint of limited resources, the system's viewpoints, methods, and theories are used to effectively manage all the tasks involved in the project. That is, planning, organizing, directing, coordinating, controlling and evaluating from the project's investment decision-making to the completion of the project to achieve the project's goals.

According to the traditional practice, when a company sets up a project, at least there will be several departments involved in the project, including the financial department, market department, administrative department, etc., and different departments will inevitably produce during the operation of the project. Friction must be coordinated, and these will undoubtedly increase the cost of the project and affect the efficiency of project implementation.

Project management practices are different. The members of different functional departments form a team because of a certain project, and the project manager is the leader of the project team. Their responsibility is to lead their team to complete all the work on time and in a high-quality way, and to achieve the project without exceeding the budget. The manager of the project is not only the project executor. He participates in the project's needs determination, project selection, planning, and finalization. It also conducts projects on time, cost, quality, risk, contract, procurement, and human resources. All-round management, so project management can help companies deal with complex issues that need to be solved across the board and achieve greater operational efficiency.

3.2.2 Project management content and three elements

3.2.2.1 Project management content

1. Project scope management

It is the management process that controls the work content of the project in order to achieve the goals of the project. It includes the definition of the scope, the planning of the scope, the adjustment of the scope and so on.

2. Project time management

It is a series of management processes to ensure that the project is finally completed on time. It includes the definition of specific activities such as: activity sequencing, time estimation and time control.

3. Project cost management

This is to ensure that the actual cost and cost of completing the project do not exceed the budgetary cost and cost management process. It includes the allocation of resources, the budget for costs, expenses, and the control of costs.

4. Project quality management

It is a series of management processes implemented to ensure that the project meets the quality requirements set by the customer. It includes quality planning, quality control and quality assurance.

5. Project human resources management

It is to ensure that all project stakeholders have the ability and enthusiasm to get the most out of a series of management measures. It includes a series of work such as organization planning, team building, personnel selection and project team building.

6. Project communication management

It is a series of measures that need to be implemented to ensure the reasonable collection and transmission of project information. It includes communication planning, information transmission and progress reports.

7. Project risk management

The project may encounter various uncertainties. It includes risk identification, risk quantification, formulation of countermeasures, and risk control.

8. Project procurement management

It is a series of management measures taken to obtain the necessary resources or services from outside the project implementation organization. It includes project work such as procurement planning, procurement and procurement, resource selection and contract management.

9. Project integration management

It refers to the comprehensive and overall project management work and process that are carried out to ensure that the project work can be organically coordinated and coordinated. It includes the formulation of project integration plans, the implementation of project integration plans, and the overall control of project changes.

3.2.2.2 Project management three elements

In project management, the three most important factors are quality, duration, and cost:

1. Quality is a must and guarantee for project success. Quality management includes quality planning, quality assurance and quality control.
2. Progress management is to ensure that the project can complete the required process on schedule. Under the guidance of a large plan, each participating construction unit prepares its own decomposition plan to ensure the smooth progress of the project.
3. Cost management is the process of ensuring that the project completes the project within the approved budget, including the preparation of resource plans, cost estimates, cost budgets and cost control.

3.2.3 The form and process of project management

3.2.3.1 The form of project management

1. Set up a specialized agency for project management and conduct special

management of the project.

The project is large in size, complex in work, and time-limited; there are many uncertainties in the project, and there are many new technologies, situations, and problems that need to be continuously studied and solved; moreover, there are many departments and units involved in the implementation of the project, and they need to cooperate and coordinate with each other. Therefore, a separate agency should be set up for this purpose, be equipped with a certain number of full-time staff, and conduct special management of the project.

2. Set up full-time project management personnel to perform full-time management of the project.

Some projects are small in scale, work is not complicated, time is not too tight, there are not many uncertainties in the project, and there are not many units and departments involved. However, the outlook is uncertain, and there is still need to strengthen organizational coordination. For such projects, we can appoint full-time personnel: to coordinate management, to assist the relevant leaders of the enterprise to contact, supervise and inspect the tasks of the relevant departments and units, and if necessary, can also be equipped with assistants for full-time staff.

3. Set up the project manager to perform temporary authorization management of the project.

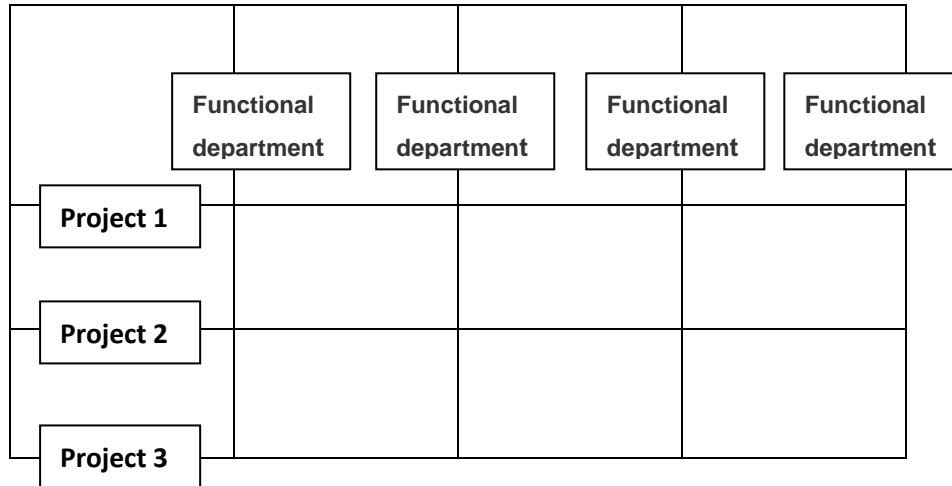
The scale, complexity, involvement, and coordination of some projects fall between the above two situations. For such projects, setting up specialized agencies is not necessary, and full-time personnel in setting up projects are worried about the lack of personnel and their strength is not easy enough. Or it may increase the amount of unnecessary management for the relevant leaders of the enterprise. The first form of special organization may be replaced by the designated competent authority. The second form of full-time coordination personnel may be replaced by the project manager and temporary. Given the corresponding powers, the competent department or person in charge fully assumes the responsibility for the planning, organization and control of the project while giving full play to its original functions or job responsibilities.

4. Set up the organizational structure of the matrix structure and conduct comprehensive management of the project.

The so-called "matrix" is the use of the concept of matrix in mathematics to combine multiple units into rectangles in horizontal rows. The matrix structure is a rectangular organization composed of two vertical and horizontal management systems. The set is a vertical departmental functional system, and the other set is a

horizontal project system made up of projects. Crossovers of the horizontal project system with the vertical departmental functional system in operation will form a matrix. As shown below:

Chart3 - 4



Each member of the matrix structure organization is to accept two aspects of leadership, that is, to accept the vertical leadership of the department in its daily work, and to accept the leadership of the project management department and the project manager when performing project tasks. Once the task of the project is completed, it will no longer accept the leadership of the project management department and the project manager. The organizational structure of the matrix enables an employee to be subordinate to several different leadership departments at a time, so it has duality and multiplicity. At the same time, it integrated the different professionals in the original vertical leadership system to complete the task of a certain project. On the one hand, it strengthened its strength, and on the other hand, it also helped mobilize its enthusiasm and ensure the completion of the project task. The advantages of the matrix structure organization form are: strengthening the horizontal business contacts of various functional departments, facilitating mutual coordination, having greater adaptability; facilitating the concentration of knowledge and skills of various specialized personnel, quickly completing a certain project task, and improving management. The effectiveness of the management system has increased the flexibility of the management organization on the premise of maintaining a relatively stable corporate functional system.

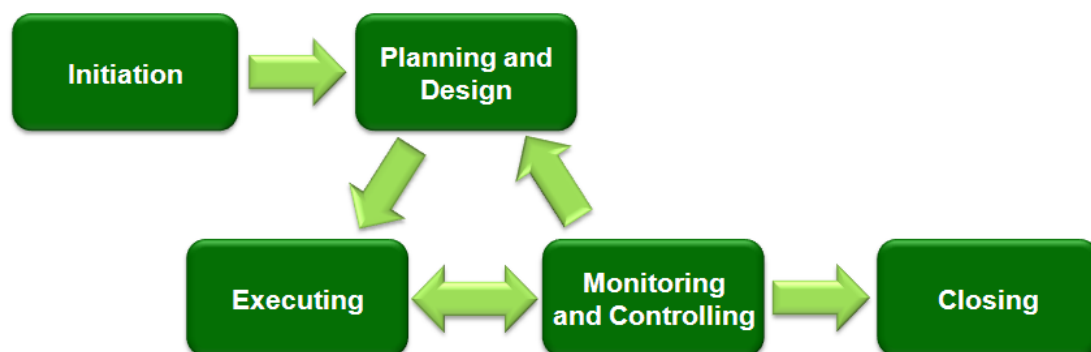
3.2.3.2 The process of project management

Project management can be divided into five process groups. The main

objectives of each process group are:

- (1) Start-up process group: Define and approve the project or project stage.
- (2) Planning process group: Determine and refine goals, and plan the necessary courses of action for achieving project goals and completing the scope of the issues to be solved by the project.
- (3) Implementation process group: Coordinator and other resources to implement the project management plan.
- (4) Monitoring process group: Measure and monitor performance regularly, and find out from the project management plan to take corrective measures to achieve the project's objectives.
- (5) Closing process group: formally check the product, service or result, and orderly terminate the project or project stage. The project management process group includes project management sub-processes that are linked to each other based on their own evidence and results. That is, the outcome or outcome of a process becomes the basis for another process.

Chart 3 – 5



3.2.4 The advantages and importance of project management

From the above we can see that implementing project management is very necessary. It's advantages and necessity are summarized as follows:

1. Properly arrange the progress of the project, effectively use the project resources, ensure that the project can be completed on schedule, and reduce project costs. Through the use of a series of project management methods and technologies such as network diagram, key path PDM, resource balance, and resource optimization in

project management, the task composition of the project can be formulated as soon as possible, and the sequence of tasks can be rationally arranged. The use of resources, especially the key resources and key resources in the project, to ensure the smooth implementation of the project, and effectively reduce project costs. If we do not use project management methods, we usually start a project blindly and arrange all resources in the project. There may be many bottlenecks in personnel and tasks, and at the same time, many resources will be left idle. This will inevitably cause Waste of resources and time.

2. Strengthen project teamwork and improve the combat effectiveness of the project team. The project management method provides a series of methods for human resource management and communication management, such as human resource management theory, incentive theory, and team cooperation methods. Through the use of these methods, team spirit can be enhanced, and the morale and efficiency of team members can be improved.

3. Reduce project risks and increase the success rate of project implementation. An important part of project management is risk management. Through risk management, the impact of project uncertainties on the project can be effectively reduced. In fact, these tasks are most easily overlooked in the traditional project implementation process and are also one of the factors that will have devastating consequences for the project.

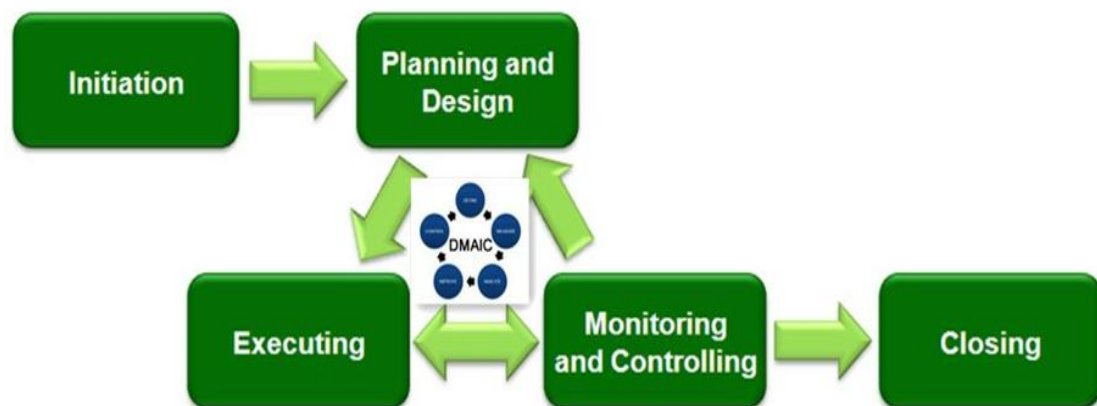
4. Effectively control the scope of the project and enhance the controllability of the project. During the implementation of the project, changes in requirements often occur. If there is no good way to control, it will inevitably have a lot of bad influence on the project. In the project management, it is emphasized that the scope of control, the establishment of the change control board (CCB) and the change control system can effectively reduce the scope of the project change. The impact of the project ensures the smooth implementation of the project.

3.3 Analyze the feasibility of Six Sigma Management in Project Management

The Six Sigma approach to management is essentially a DMAIC performance improvement model—a customer-centric approach to analyzing problems and solving problems. It forms the basis of Six Sigma management theory, and all processes and activities are closely related to DMAIC. And the process of project management is

also the same. The entire process is customer-centered, and the completion of the project is achieved in the process of consistently satisfying the customer's quest and improvement. This is also the biggest common point between the two, although the management methods, processes, and forms of the two are different. However, based on this common point, Six Sigma management methods and management ideas can be applied to project management. The application of Six Sigma method in Project management also includes these five stages: definition stage; measurement stage; analysis stage; improvement stage; control stage.

Chart 3 – 6



1. Definition stage

The definition phase is the first step in the implementation of the Six Sigma project. The first step in this phase is to make clear: Who are our customers? What are the customer's requirements for completing the project? What are the problems we need to solve? How is the problem expressed? What is our goal? When should this goal be achieved? What are the key factors to solve this problem? What is the process of investigation? Who are the personnel and departments involved in the implementation? By thinking about and answering these questions in order to formulate DMAIC project plans to integrate into the entire project management process.

(1) Identification process and our customers

The key to the Six Sigma management approach is to identify the core processes and key customers. Through this step, you can understand the general structure of the problem and gain a clear understanding of the entire project. If we don't know what the customer really needs, can't truly understand the customer's needs, the customer's evaluation of us, we can hardly give them what they want. When we do not know what the problem is, we cannot solve that problem. The more accurate we define the problem, the clearer our goals will be and the more chances we will hit the bull's eye. If you only say 'I feel uncomfortable' to the doctor and the doctor doesn't ask you

more questions or perform any checks, I'm afraid the doctor will not cure your illness. Therefore, to clarify the problem, we must first clearly define the problem. In the Six Sigma approach, we use all repetitive activities as a process to analyze their inputs and outputs in order to identify the key factors that affect our product and process capabilities. So where are our customers? A customer is a person who receives our products, who may be an external purchaser of our products or services, or may be the operator of the next process in our process. Six Sigma is process-oriented. It takes the product and service quality, cost, efficiency, customer satisfaction, customer loyalty, etc. as the output of the process. To make these results good, it is necessary to analyze the factors that affect the output of the input process. And control, that is, to grasp the "causes", continuously measure, analyze, improve, and control the key input variables in accordance with the characteristics of multiplicity, expansion, and continuity of the process, one by one, and one by one. To solve the problem, step by step to improve the quality characteristics, and continue to strive for perfect flawless direction.

(2) Define and clearly describe the problem

A project is to be supported by different departments and different people. Using a clear definition is a strong guarantee for other people to understand, communicate and support. This is like a manual we drafted for our products to ensure that everyone's understanding is consistent. A good project must be defined in the definition phase should have a complete definition and scope of the project, there must be no ambiguous fuzzy concept.

(3) The establishment of a team

The Six Sigma project was completed through teamwork. The project team is composed of the personnel involved in the project, such as: technology, production, engineering, procurement, sales, finance, management, etc. And the project team is generally composed of 3 to 10 people and should include the person management responsibilities for the improved process.

2. Measurement stage

The purpose of the measurement phase is to identify and record process parameters that have an impact on key process performance and products, measure current process capabilities and quality levels, identify where problems are and where they are, in order to develop improvement goals. There are many factors that affect quality, but usually only 20% are the key factors. Six Sigma management pays close attention to this 20% key factor, which is the key to seize the problem. At this stage, it is necessary to initially find out what are the key factors determining customer demand based on the defined issues. What indicators are used to measure it? According to the

characteristics of the indicators, a corresponding measurement system and collection plan for data and information are established. Through the testing of the current process conditions, the inputs affecting the process output are identified. The determination of the measurement method for project quality management can be divided into two categories, namely estimation and measurement, in terms of pre-management and post-event management. The estimation is based on the actual statistical survey data, and indirectly estimates and predicts the quantitative relationship and the prospect of changes in the matter based on the relationship between the things and their development rules. And metrics measure the differences between current things and standards based on specific criteria. Estimates need to be made when planning a project, and the process of tracking and monitoring during project execution needs to be measured. Good project management is mainly used to track and measure the project elements. By analyzing the measurement data, the problems existing in the progress of the project can be discovered in time, and the solutions can be formulated accordingly.

3. Analysis stage

The purpose of the analysis phase is to identify the key and potential causes of the performance indicators. Due to the complexity of the Six Sigma project, if there is no scientific data analysis, it is difficult to ensure that the true, fundamental causes can be found. Therefore, a variety of statistical methods and management techniques should be comprehensively used in the analysis stage to conduct statistical analysis, comparative testing, defect analysis, variation source analysis, key factor analysis, multiple mutation analysis, correlation analysis and regression analysis, failure mode, and effect analysis of data (FMEA), operation value-added analysis, etc. Discover and prove solutions or implementation solutions that you already know by using reasonable statistical tools from the Six Sigma “toolbox” to discover unknown problems.

(1) Confirm the existing capabilities of the process and define the goals of the process
The main task of the analysis phase is to use the measurement system to conduct status surveys and collection of receipts, make full use of all the information and data collected during the measurement, and determine the key inputs affecting the output through data analysis, that is, determine the key influencing factors of the process. Determine that the actual problem translates into a quantitative and statistical problem, define the problem more accurately once again, and clarify the difference between the status quo and the target.

(2) Determine the key factors to change the process capability

This stage requires the collection and analysis of the data obtained in the measurement phase, and on the basis of the analysis to find the source of the fluctuation, and put forward and verify the hypothesis of the causal relationship between the source of the fluctuation and the quality result. After the causality is clear, determine the determinants that influence the performance of the process. These determinants will become the focus of attention in the next phase of the improvement phase. The main task that should be completed in this stage is to grasp the problems to be improved and find the entry point for improvement, that is, the determinants of performance results. Team members need to analyze past, current performance data and define the direction of future performance. The collected data can be analyzed through various tools such as brainstorming, histograms, and arranging graphs to find an accurate causal relationship. At this stage, the team must be cautious, analyze potential problems by piloting on a small scale to determine what will happen and prevent the wrong trend.

(3) Specificity of Influencing Factors in Project Quality Management

The characteristics of the project lead to its easy quality variation. That is, the inconsistency of project quality data. There are two reasons for this variation: accidental factors and system factors. Occasional factors are randomly generated, objectively existed, and system factors are artificially abnormal. The variation caused by accidental factors has a minor impact on the quality of the project. It is a frequent occurrence that is difficult to avoid, difficult to identify, and difficult to eliminate. The variation caused by system factors has a large impact on project quality and is easy to identify. It can be avoided by taking measures. It can also be eliminated. However, in terms of project management, these two types of factors in different projects, because of different levels of personnel, the environment, and product requirements vary, so in the quality control of the project should take appropriate methods and means to identify the quality of variation and The difficulty in control is how to effectively identify and distinguish the above two factors.

4. Improvement phase

The improvement phase is mainly based on the root causes found in the analysis phase, boldly proposes problem solving solutions, and looks for solutions that optimize the process output and eliminate or reduce the impact of key inputs, thereby reducing process defects or variations.

(1) Propose a solution

Based on the analysis phase, we propose solutions to the key issues. The solution approach is to set benchmarks by using other people's good experience or tools

directly, such as the experience of the same industry. In the improvement phase, it is necessary to fully integrate the actual conditions of the company, whether there is a system of data management systems, whether to establish an enterprise resource management information system, whether to establish inter-plant quality assurance systems with suppliers, and so on. It is necessary to grasp the main issues, pay attention to feasibility analysis, employees' attitude towards change, and corporate leaders' support for improvement programs.

(2) Determine the optimal solution

The improvement step should start with the improvement plan that decides whether to remove or reduce the main factors affecting the results. Because not all possible improvements are equally effective, the project team must consider a series of possible improvements and then determine the most effective and appropriate one. The initial task of the team is to identify a variety of possible alternative solutions. Brainstorming is often useful here. The project team identified many possible improvements and they should evaluate the impact of each improvement on the problem and the business. After evaluating alternative options for improvement, breakthrough improvement teams often agree with the most promising solutions. Sometimes, the team will combine some of the features of several improvements to absorb their strengths. The improvement plan should be evaluated and screened, and some comprehensive evaluation techniques can be used to select the plan. For some engineering problems, DOE (Design of Experiments) technology can be used for process parameter optimization or product design improvement. At this stage, some non-traditional creative thinking methods are also very helpful. In order to ensure the success of the implementation of the plan, some local commissioning tests are needed when necessary to verify the improvement plan. In the conventional production of continuity, the periodicity and repetitiveness of its activities make it easy to apply the improvement plan to the next production cycle. However, the one-off features of the project cannot directly apply the improvement plan. This requires the in the selection of the program, full consideration is given to the factors of change applied at the time of different projects.

5. Control stage

The purpose of the control phase is to maintain the effectiveness of the improvement project. In the control phase, the process improvement document or work instructions must be updated in the quality management system, the process control system and the action plan in the absence of control should be established, and the statistical process control should be used. The technology monitors the process in real time. In addition, at this stage, it is an important task to further promote the project results to

other similar business processes. Since the personnel, environment, equipment, and products are changed in different projects, compared with the application in conventional production, it is particularly necessary in the control phase to constantly modify the product requirements standards, equipment parameters, environmental indicators, etc. Train people who influence the process.

3.4 Analyze the limitations of Six Sigma Management in Project Management

Six Sigma management is based on data and stable process control and solves problems that cannot be solved by conventional methods and simple tools. The lack of one-off features and quantitative basis of the project makes it difficult to use the Six Sigma method.

The Six Sigma method is a method that attaches great importance to data collection and analysis. All stages of DAMIC are based on the analysis of data. In the production process, this is not difficult to achieve, the production process has been determined, the customer's requirements for quality are clear and it is easy to measure accurately. However, in project management, project managers must often face sudden problems. Their solutions often have no precedents to follow. Management processes are often affected by many factors. The performance of many jobs is difficult to use clear data. Measured, if you want to clarify the problem more clearly, evaluate performance, and initiate improvement activities, the biggest obstacle is fuzzy data and data.