

The Project Champion's Role

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Introduction

The effectiveness of Project Champions is critical to the success of any Six Sigma effort. The Champion's ability to fulfill their role to select, scope and manage Six Sigma Black Belt projects is directly correlated to the project's success rate. These critical areas have proven to be a challenge for many organizations due to the lack of emphasis in training and a minimum amount of related available literature. To date, many of the skills required for an effective Six Sigma Project Champion have had to be acquired primarily through on the job experience. This paper focuses on the knowledge, tools and methods required to successfully select, scope and manage Six Sigma projects.

The group session will cover the role of a Six Sigma Project Champion as elucidated in three separate papers:

- Ideas and Methods for Six Sigma Project Selection
- Effectively Scoping Six Sigma Projects
- Guidelines for Six Sigma Project Management

This paper will accomplish the following learning objectives:

- Learn about ideas for generating Six Sigma projects
- Understand how to tie Six Sigma projects to the strategic objectives of the organization
- Obtain an appreciation for the importance of proper project scoping and its potential impact
- Use the definitions of a Six Sigma project and the applicable tools to effectively scope Six Sigma projects
- Understand the tollgate project review process including critical gate requirements and questions
- Establish the methodology suggested for Six Sigma project management

Project Selection

A question often posed by senior management is "How do I get the people in my organization to do what our customers want and need them to do?" In an ideal situation, performance objectives are set based on the wants and needs of the customers and then cascaded throughout the organization. It is the responsibility of Project Champions to be knowledgeable about these objectives as they identify projects for their Black Belts. By the time these objectives reach Black Belts, they should be in the form of a properly scoped project. Communicating the strong linkage of objectives to the lower levels of management and throughout the organization, as well as establishing a robust performance monitoring and review mechanism, will ensure active participation at all levels in Six Sigma. In order to satisfy the wants and needs of the customer, projects must be selected that are aligned with the business objectives. One of the most critical success factors for Six Sigma projects is proper project selection.

Roles and Responsibilities

Although Project Champions are seen as lead players in project selection, many others in the organization play important roles. In order to have a successful Six Sigma implementation, everyone in the organization must be an active participant. Deployment Champions, Project Champions, Master Black Belts, Black Belts and Green Belts each play an important role. The responsibility of these participants as well as those of the Process Owners and Operations Management needs to be tied to performance objectives. Executive management sets the business objectives. The Process Owner knows the business. Project Champions are responsible for being intimately familiar with these business objectives. Moreover, they are responsible for translating these objectives into action plans and developing a list of potential projects for Black Belts, which is the project selection process.

Some of these action plans cascade into the daily job responsibilities of their employees while others are project based. Daily job functions are usually routine "just go do it" type activities or projects with known solutions. When the solution to a project is unknown, more emphasis is placed on it and resources are allocated accordingly. These projects may be attacked using Lean Thinking, Six Sigma or other problem solving tools. Those deemed appropriate Six Sigma projects are then subdivided into Green Belt and Black Belt projects. This may be done on the level of difficulty/complexity, project savings or some other method of categorization. Often, these action plans evolve into Six Sigma projects. Black Belts want to and must work on top issues to improve customer satisfaction and eliminate waste.

Special considerations need to be taken into account if the project is product/technical or business/transactional in nature. Subject Matter Experts need to be part of the team. There is often a need to develop an attribute-based measurement system for business projects. In contrast to technical projects, business projects usually involve different data types, different (attribute) measurement systems, and the use of different statistical tools.

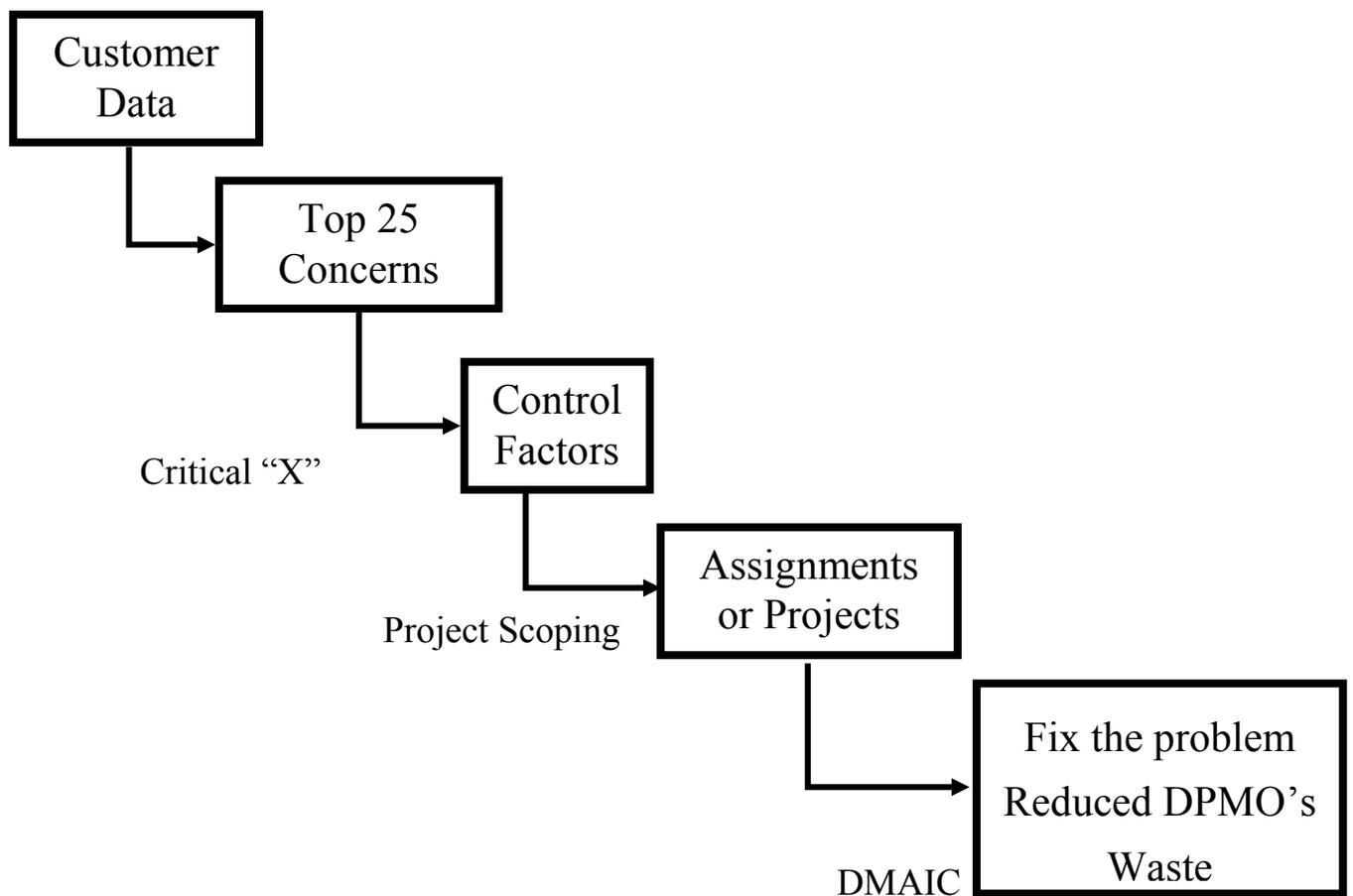
Once performance objectives are set based on the above roles and responsibilities, a cascade process can be utilized to drive the project selection process based on the strategic objectives. Ideas and methods for project selection can be utilized using bottom-up or top-down methodology.

The Bottom-up Process

The bottom-up process is a project selection process in which the ideas for projects are developed from within the operational level of the organization. The bottom-up process may depend on networking with others in the corporation. Although this method may use the internal voice of the customer, in most cases it is not data-driven and ignores the needs and wants of the external customer. Emotions often come into play as people try to get their pet projects assigned to a higher priority. These projects are usually not tied to the strategic objectives and therefore fail to get sufficient support. Without management buy-in and support, the project is likely to fail due to insufficient resources. The bottom-up method is most likely used by companies in the infancy of implementing Six Sigma and shows the need to develop a systemic data-driven process.

The Top-down Process

The top-down process of project selection takes the ideas for projects from high-level business objectives and transforms them to operational level issues. The top-down process can develop a next- up project list for Green Belts and Black Belts by looking at top issues in a product line or cross product line issues. The problems can be quantified utilizing data sources such as warranty returns. One popular tool to use here is the Pareto chart. This will improve project prioritization. If more than one criterion is used to develop the list of projects, weights can be assigned to each factor so that a Single Agenda can be developed. For example, the Single Agenda may look at the top 25 issues in a product line such as a particular car or truck or the top 20 cross product line issues such as wind noise across all vehicle lines the company manufactures. The $Y = f(x)$ transformation equation can be used to cascade strategic objectives across the organization. This will enlist the highest level all the way to the lowest level working on the same objectives. The top-down process is tactical in that it finds projects for the Black Belts and Green Belts. It is an on-going process. By determining which objectives are not being met through daily operating activities and other problem solving methods, the top-down method is often utilized to help tackle what causes the most pain in the organization. It can also be strategic in nature. An annual process can determine which projects will be assigned to Black Belts and Green Belts throughout the year to meet the business objectives. The top-down process of project selection is tied to critical business processes and incorporated into the annual business planning process. A pictorial representation of the top-down project selection process is shown below.



Resource Allocation

One of the most critical decisions for a Project Champion, as well as any manager, is determining how to allocate resources. Project selection involves allocating appropriate human, technical and monetary resources to projects. A good way to start is by performing a gap analysis. By seeing which areas fall short of their intended goals, it can easily be decided where to deploy resources. Some Project Champions take a strategic approach and put the majority of resources on "fire prevention" types of projects. This allows them to focus on core business processes that compliment the business plan. Others take a more tactical approach and reserve some resources for "fire fighting." These projects are usually higher in visibility and tackle unexpected issues.

Next-Up Project List

As an organization gets its Six Sigma program up and running, it is soon discovered that one of the top priorities is to have a next-up project list. This bookshelf of project ideas will help the organization to sustain the cadence of problem solving. As soon as a Black Belt completes his or her first project, there will be another in the queue to tackle. Eventually, the Black Belt will learn how to handle multiple projects at one time as well as identify additional projects that will benefit the organization. This list of next-up projects may be prioritized on net present value, which helps to improve the effectiveness of project selection. There may also be some projects where further scoping is required. Some current Black Belt projects may be replicated as Green Belt projects.

Requirements To Make An Issue A Project

An important decision dilemma the Project Champion has to face involves determining how to develop an issue as a project. The first step in selecting a project is to gather data. The availability of data as well as the ease of collection must be considered. Many times the data collection step is left for the Black Belt. This slows down the time-to-completion of the project, leads to "false starts" and decreases the rate of project throughput for the organization.

A successful Project Champion has a methodical, data-driven prioritization process. Depending on the goals of the organization, projects may be prioritized by factors such as waste elimination, time to implement, or other criteria.

Project Selection Checklist

A useful tool for the well-organized Project Champion is a Project Selection Checklist. Here are sample questions to pose in the checklist: Is this a recurring event?

- Is the scope narrow?
- Is data readily available?
- Is one of the team members in control of the process?
- Will solving this problem increase customer satisfaction?
- Will there be a sufficient cost savings?

Conclusion

A Black Belt will only be as effective as the project that has been selected for him or her. It is the responsibility of the Project Champion to find a project for the Black Belt. Regardless of what project selection method the Project Champion uses, the project must be tied directly to the business objectives of the organization and ultimately increase customer satisfaction.

Project Scoping

Project scoping is another critical role of a Six Sigma Project Champion. Project scoping is one of the largest areas of opportunity within many organizations' Six Sigma deployment effort. The issues have centered primarily around "over-scoping" the Black Belt's initial project. The ultimate responsibility for project scoping lies with the Project Champion, however the Black Belt has a vested interest and should be included in the process. Especially if inexperienced, the Project Champion should leverage all available resources to effectively scope a project. These resources include, but are not limited to, Master Black Belts, other experienced Black Belts, Process Owners, Technical Specialists, Subject Matter Experts, Deployment Directors and outside consultants.

Definition of a Six Sigma Project

In order to accurately scope a Six Sigma DMAIC project there must be a consensus as to what constitutes a project. Juran defines a project as a "problem scheduled for solution."¹ Another definition is "a problem scheduled for a solution with corresponding metrics that can be used to set project goals and monitor progress."² It is assumed that there is an important distinction between projects with known and unknown solutions. With this definition, Project Managers handle projects with known solutions, and Six Sigma Black Belts handle projects with unknown solutions. Additionally, understood in this definition is that projects should contain quantifiable metrics intrinsic to organizational performance. These metrics are used to track the progress of the project. In summary, one of the most critical aspects of a Six Sigma project is to provide a measurable benefit in terms of cost, quality, timing and/or customer satisfaction.³ Consequently, a project that cannot be completed in a reasonable period of time should not be accepted as a Six Sigma project. While this may seem shortsighted, it merely reflects the reality of resource allocation. Since resources are limited, attention should be given to Six Sigma projects that have the highest benefit-to-cost ratio in the shortest amount of time.³

Therefore, Key elements of a Six Sigma DMAIC project are:

- **Problem-Solving:** The project should address a problem, with an unknown solution, that addresses an organizational performance issue
- **Goals:** The project should have clear numerical goals directly tied to a well-defined set of metrics, that correspond to the opportunity
- **Project Tracking:** Progress should be tracked through the well-defined set of metrics
- **Business Benefits:** The project should culminate in a measureable benefit in terms of cost, quality, timing and/or customer satisfaction
- **Implementation Schedule:** The project benefit must be realized in a reasonable period of time (typically defined as 3-6 months)

Some additional points providing further clarification in the definition of a Six Sigma DMAIC project are:

- Six Sigma Process: The project should follow the DMAIC process for problem-solving.
- Six Sigma Tools: By following the DMAIC methodology, an appropriate subset of the Six Sigma tools should be utilized to deliver phase outcomes.
- Capability and Confidence: The project should serve to increase the self-confidence of the Black Belt and the Project Team in utilizing the DMAIC methodology. Simultaneously, successful results increase corporate confidence in the Six Sigma effort.
- Process Orientation: The project should be viewed from the orientation of improving a process (not necessarily addressing a resultant issue).

It is important to establish these points in the definition of a Six Sigma DMAIC project, as they are essential in the effective scoping of the project. Without a clear definition, it is difficult to wade through the particulars of a project in order to narrow the scope and obtain a clear concise objective, with boundaries that will enable a timely resolution to the issue at hand.

Narrowing the Scope

With a clear definition of the Six Sigma DMAIC project, the importance of an effective project scope is evident. Precise scoping allows the Black Belt and Project Team to remain within the specific guidelines of a Six Sigma DMAIC project. One of the most difficult tasks for inexperienced Black Belts and Champions is to grasp the concept of developing and refining a focused scope for powerful problem solving. The DMAIC process is analogous to a funnel, where a broad organizational issue is progressively scoped down to a manageable and actionable level, initially using the definitions of a Six Sigma project, and then the Six Sigma tools. The result is a problem that can be easily understood and readily addressed with laser focus.

Focusing the scope to meet the very specific definitions of a Six Sigma project is important to the success of the project as well as the success of the organization's entire Six Sigma program. One initial concern, that of inadequate project scoping, is the additional time required to close the project. There are many negative connotations associated with extended project duration due to improper project scoping. When time-to-completion increases, the tangible cost of the project deployment (i.e. cost due to labor and material) will increase. Other additional increases in intangible costs include frustration due to lack of progress, diversion of manpower away from other activities, and delay in realization of project benefits. When the project duration starts to exceed six months, these intangible costs may result in team-member turnover, causing further delays in the project. Subsequently, the longer projects continue the harder they are to close. These expanded scope projects are often called 'world peace', 'world hunger' or 'boil the ocean' projects. They have laudable but unrealistic goals, and generally serve to frustrate team-members. These types of projects can also undermine the credibility of the entire Six Sigma program.³

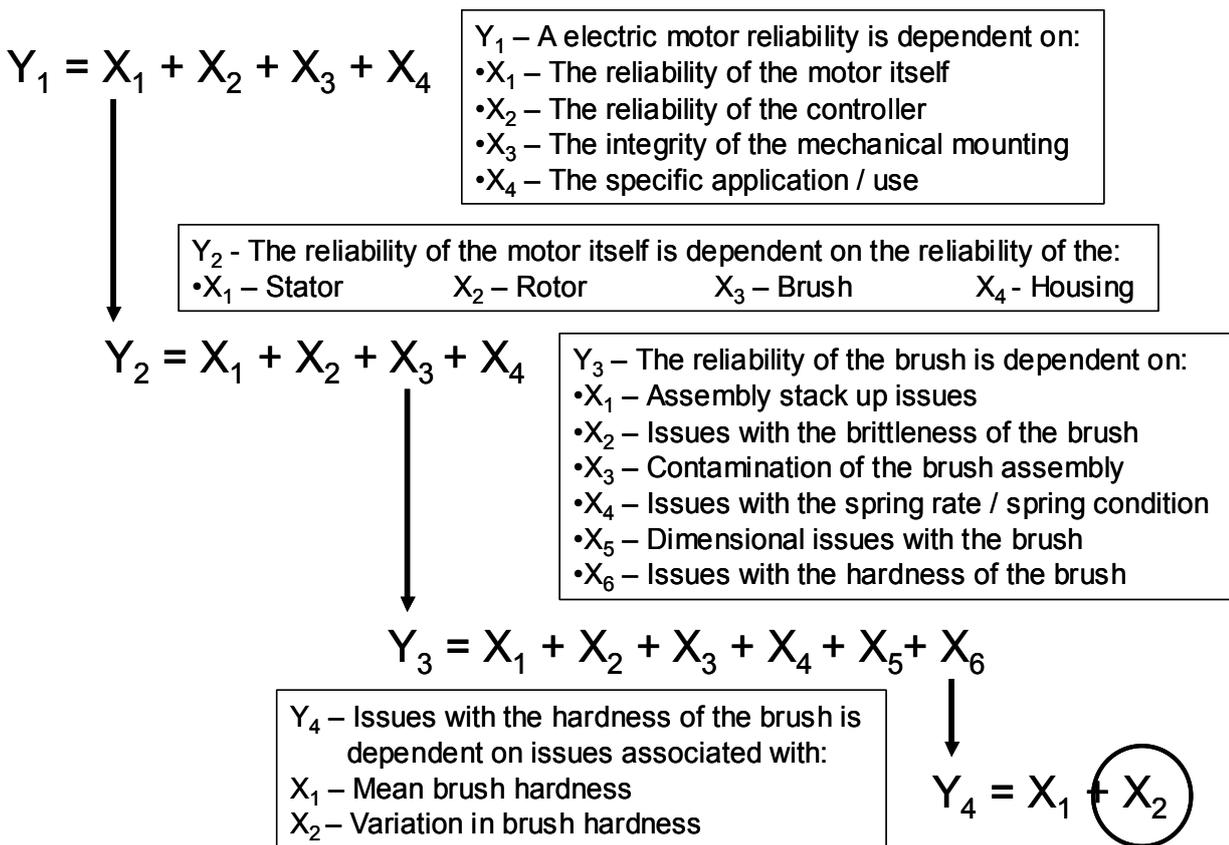
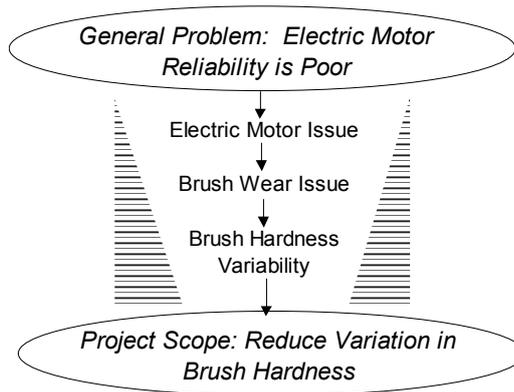
Ideally, Six Sigma DMAIC projects should be scoped to be completed in 3-6 months, and concentrate on a specific area of interest, as stated in the majority of the literature. Larger projects, or projects targeting more than one area of concentration, should be divided into subsequent projects. In some cases, data collection and analysis may be required, in order to accurately scope a project. In other cases, a project initiated with an original broader scope may require the team to go back to the project definition phase and re-scope after the data has been assembled, to ensure the focus is correct. If "re-scoping" of the project is required, the original project charter should be re-visited to ensure all commitments are aligned with the new scoping.

The dilemma then becomes, if a Six Sigma project has an unknown solution how are the completion time and benefits determined? This is where the Six Sigma experience level and the scoping tools are required. As their project experience increases, Six Sigma personnel will improve at utilizing the tools, to develop project scopes that meet the definitions of a Six Sigma project, while simultaneously producing quantifiable benefits. As previously stated, data collection may be necessary to successfully scope a project. This data includes information pertaining to the projected benefit, in order to ensure that as the project scope is continually narrowed, the benefit can be tracked. A continuous decision making process needs to transpire, in balancing time involved in the project (based on the anticipated activity) and the expected benefit. Since experience is crucial, the high risk, longer term, high payout projects should be left for the most experienced Black Belts and possibly even handled as a Master Black Belt mega project.

Tools Used for Scoping a Project

As stated above, there are a number of scoping tools that can be used to dissect a project and establish an ideal scope. To ascertain that a project is accurately scoped, a high-level process map, $Y=f(X)$ diagram and a cause and effect diagram are excellent tools that can be developed as an indication of scope effectiveness. After developing the process map, $Y=f(X)$ diagram or cause and effect diagram, the scope or area of focus should be outlined on the map/diagram by circling the respective part of the process. If the circle encompasses a large area of the process, or if more than one circle exists in separate parts of the process, the project is more than likely 'over-scoped' and should be re-focused.

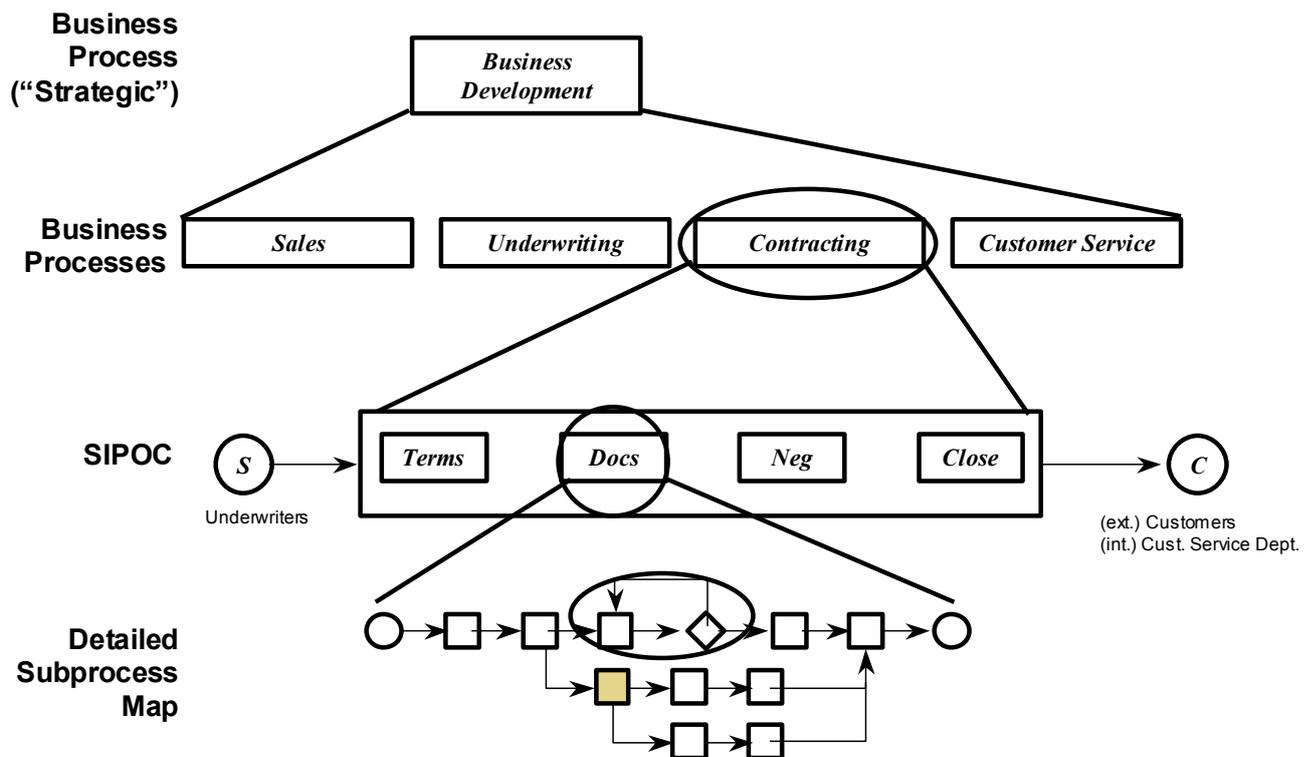
Below is an example of a Six Sigma DMAIC project, which has been accurately scoped.⁴ The project was originally outlined to address electric motor reliability. Through consideration of the Six Sigma project definition points, using the scoping tools and data, the reliability issues could be attributed to an electric motor issue. Given the breadth of issues associated with an electric motor, the scope of the project narrowed, to a specific brush wear issue, more specifically, brush wear hardness variability. See the $Y=f(X)$ diagram which outlines the steps taken to narrow the scope where each subsequent step was made by using data. Now we can correctly plan the Six Sigma DMAIC project, with a scope of reducing variation in brush hardness. If continuous data were taken, specific accounting can attribute the benefits in reliability of the electric motor, through improvements made to the brush. A specific set of metrics demonstrating reduced variation in brush hardness, can be developed for the scoped project. These metrics will be tied to the original outlined issue of electric motor reliability.



A process map can also be used as a tool in adequately scoping projects. A high-level process map outlines the boundary area for a project scope. The area addressed by the scope in a process map is then circled. If the circle encompasses a large process area or if there is more than one circle in separate areas of the map, the project may be "over-scoped." The series of process maps listed below outlines an adequate scoping for a project. Notice the boundary of the project outlined by the circle in the high-level SIPOC (supplier-input-process-output-customer) process map. Also note that one specific area of the detailed sub process map is circled reflecting the scope of the project.

A cause and effect (Fishbone) diagram can be used to outline the boundary area for the project scope in the same manner as the process map, however with respect to causes instead of process

steps. A Pareto chart can be used to break down a project scope using numerical data. The Pareto chart is typically used in conjunction with one of the above methods to select the area of focus. The scope of the project is usually limited to the vital few contributors to the issue as outlined by the Pareto chart.



Scoping a Black Belt's Initial Project

The preceding ideas on narrowing projects are even more significant when considering new Black Belts or Black Belt candidates. It takes time for these new Black Belts to build confidence. A Black Belt's performance on their first project will set the stage for their success with the Six Sigma program. Likewise, it takes time for the new Black Belts to become familiar with the method and tools of Six Sigma. The best way to increase a Black Belt's confidence and improve their skill set is through the timely completion of narrowly-scoped projects. Larger projects are not only more complicated to execute, they typically require using more of the sophisticated, advanced tools. Assigning Black Belts progressively more complicated projects encourages them to gradually build their skills, while simultaneously building their confidence. This period is crucial to provide the Black Belts with vital support in terms of Master Black Belts and Project Champions. If a Black Belt loses confidence due to an unsuccessful initial project, it may be difficult for them to rebound and become successful in the future. The resulting deflated attitude, due to lack of confidence, may cause the Black Belt to lose faith in the Six Sigma effort.⁴ A great deal of documentation places emphasis on a minimum project value of \$250K per project. Often lost in translation is that this figure is usually derived from experienced Black Belt projects, or averaged from a population with a high percentage

of experienced Black Belts. A new Black Belt should concentrate primarily on scoping the project in order to achieve the following objectives:

- Achieve closure in a 3-6 month period
- Follow the DMAIC process
- Utilize a sample of the Six Sigma tools
- Most importantly – GAIN CONFIDENCE

Initial Barriers to Effective Scoping

There are many barriers to effectively scoping Six Sigma DMAIC projects. Several are centered on education and experience. Since there are limited documented resources, a great deal of the Six Sigma training efforts have failed to address the topic in sufficient detail. As stated previously, the Six Sigma team has been forced to learn through trial and error experiences. While invaluable, this experience takes time to develop. Given the fact that Six Sigma is relatively new in most organizations, this experience is not abundant, and many companies are struggling with this issue.

Another barrier to effectively scoping Six Sigma DMAIC projects is the lack of Master Black Belts within organizations. Most literature states that there should be one Master Black for every ten Black Belts. However, this ratio is not always maintained.³ Since Master Black Belts are usually the most experienced personnel in a Six Sigma program, their experience can play an integral role in effectively scoping projects. Furthermore, they can serve as a liaison, balancing the sometimes-conflicting underlying goals of the Black Belt and the Champions. The value of their project experience cannot be underestimated when considering effectively scoping a new project.

Other issues in the effective scoping of Six Sigma DMAIC projects are potentially conflicting goals between a Champion and the Black Belt. As described above Six Sigma DMAIC projects can be developed using either a "top-down" or a "bottom-up" approach.³ Advantages of a "top-down" approach are that the projects are aligned with the organizational business strategy and most often linked to the customer needs. The disadvantage is that they are typically broad in scope and require focusing to fit the definitions outlined above for a Six Sigma project. The breadth of scope in the projects from a "top-down" approach is evident due to the nature of the issues in executive management as well as the incentive for obtaining significant organization performance improvement. At times, this incentive can serve to undermine the Six Sigma effort by overriding the Black Belt goals to scope a project that is narrow enough to reach closure in a specified period of time. The projects using a "top-down" approach can often be divided into a number of separate, subsequent projects. Another problem with the "top-down" approach is that not all Champions have the background, skill-set or time to enter into scoping exercises with the Black Belt. If an organization is going to partake in this type of approach, the Champions must be trained and provided sufficient allocation to Six Sigma in terms of time and effort to work with the Black Belts. This will ensure that projects are adequately scoped. It is important to note that in the Six Sigma process the Champions are ultimately responsible for scoping projects.³

The "bottom-up" approach to developing projects can serve to address the issues of over-scoped projects. However, they may not be linked directly to the organization's strategic objectives or may fail to contribute to the bottom line. Typically, this is the charge leveled against TQM-era projects.³ Projects incorporating a "bottom-up" approach are characteristically scoped by the Black Belts themselves and are usually narrow enough to be well-suited for a Six Sigma DMAIC project. An issue with these projects is that they have a low closure rate due to lack of management support because they are not linked to the organizational objectives. The net result can be similar to the issues

surrounding projects using the "top-down" approach; low project closure rates, morale issues among Black Belts and eventual loss of confidence within the organization with respect to the Six Sigma effort.³ The best solution is a blend of the two methods with the Champion, Black Belt and Master Black Belt working in conjunction. This will facilitate the achievement of organizational objectives, while working within the guidelines of the Six Sigma methodology.

Final contributing factors for issues in scoping Six Sigma Black Belt projects can be cultural. For instance, in The United States, it is culture and bias to attempt to go for the biggest goals in the shortest amount of time. Americans are interested in the quick fix, the fast turn-around, and often go for the homerun instead of being satisfied just hitting singles. What is sometimes forgotten is that a constant barrage of singles can ultimately produce more runs than a few sporadic homeruns. In addition, the singles contribute more to the team approach. This analogy has many important points that ring true in dealing with scoping Six Sigma projects. Often more can be attributed to the bottom line of an organization by completing several successful smaller projects, rather than working on a few larger projects over a longer period of time.

Conclusion

Effectively scoping Six Sigma DMAIC projects is a crucial part of the Six Sigma process and an imperative Six Sigma Project Champion Role. An understanding of the definition of a Six Sigma project is the first step to effectively scope the project. Scoping tools, such as a high-level process map, $Y=f(X)$ diagram and a cause and effect diagram, are effective means for scoping a project. Understanding these tools and the definitions is critical to the successful narrowing the project scope. When scoping a project, a balancing act needs to occur between the time involved in the project and the expected benefit, with the longer-term more complex projects handled by more experienced Six Sigma personnel. Effectively scoping a Black Belt's initial project is even more crucial, given their lack of experience and confidence in the Six Sigma effort. Overcoming the barriers to effective project scoping is critical. Not only to effective project scoping, but also to the entire Six Sigma effort. Addressing these barriers and effectively scoping the projects, especially for a Black Belt's initial project, will ensure the success of Black Belts, the backbone of Six Sigma.

Project Management

Project management is another critical role of the Six Sigma Project Champion. The keys of successful project management can be broken down into five separate areas:

- Project charter
- Project plan – Black Belt Gantt chart
- Weekly master schedule reviews (GYR)
- Formal tollgate review processes
- Champion and Black Belt accountability

Project Charter

A project charter indicates an overall commitment between the Project Champion and the Black Belt and project team. Like scoping, the project charter is the responsibility of the Project Champion however the Black Belt has a vested interest and should take a role in its development. The project charter is a contract between the Project Champion and the project team that outlines the resources and support that the Project Champion will provide in return for the project deliverables. The project charter should be updated if any changes in the project result in violations of the original

agreement. The project charter is really a means to control, manage and approve Six Sigma projects. It helps to avoid projects that:³

- Deal with unimportant issues
- Overlap or conflict with other project objectives
- Target soon to be obsolete processes or products
- Have poorly defined or overwhelming scope
- Study symptoms instead of root cause
- Provide poorly defined deliverables
- Lack management authority and responsibility

Typical elements in a project charter are:³

- Purpose – a brief statement of the project purpose
- Problem statement – a summary of the problem to be addressed
- Objective – the specific outcome desired
- Scope – the aspects of the problem that will be address (can refer to Y=f(X) diagram or process map)
- Milestones project plan (Gantt chart) – the timing for the milestones with responsibilities
- Stakeholders – the departments, customers and / or vendors will be influenced by the project activities and / or outcome
- Champion – the mid to upper level manager who supports the project, funds the project, allocates resources, and develops the initial charter (which is then managed by the assigned project leader, who is usually a Black Belt) – as a member of management, the Champion builds support for the project in the managerial ranks of the organization – the Champion's managerial position in the functional area that is the subject of the improvement project helps to build awareness and support for the project in the operational ranks, as well as to clear roadblocks that might inhibit the timely progress of the project
- Team – team members typically include the assigned Black Belt, Green Belt(s) (if available), subject matter experts, people from the project area, a financial representative and any other personnel whose participation on the team would add value to the project
- Resources – any processes, personnel, equipment, IT support, information and funding required for the project
- Business case – this is the justification for taking on the project including financial aspects like financial ratios and other documented costs that are affected by the project – these financial considerations for the project could be hard dollars or soft, such as cost avoidance, lost revenue, etc
- Deliverables – include all measurable benefits from implementing the project – these benefits include the hard and soft savings from completion of the project as well as the desired levels of the project metrics – the deliverables define what constitutes success with the project

Project Plan

Project planning can be summarized as applying good project management principles to the Black Belt Six Sigma project. Project management keeps the project on schedule, communicates changes or progress in the project, and action items and responsibilities.³ Every Black Belt project should have a detailed Gantt chart that outlines the projected start and finish dates for the project as well

as the detailed milestones in between. The milestones for the Six Sigma project should be correlated to the ends of each of the phases from the DMAIC (define-measure-analyze-improve-control) process. Within each phase a detailed work breakdown structure should be developed with each task identified along with its corresponding timing and responsibility. This detailed Gantt chart should then be used to manage the daily control of the project and to make decisions, and should be included as part of the project charter.

Weekly Master Schedule Reviews

The weekly master schedule review is intended to be a high-level weekly review of the all of the continuous improvement efforts under the direction of the Project Champion. This could be any number / combination of Six Sigma, Lean or projects from any other continuous improvement efforts. This meeting should be a fifteen-minute stand-up meeting centered on a large master schedule board. The purpose of the meeting is to determine if the projects are progressing according to their Gantt chart at a high level. There should minimal detail discussed regarding the individual projects. The meetings should be very efficient, outlining the areas that need to be addressed. The meetings are held standing up in order to stress the fact that they are only update meetings and only fifteen-minutes in duration. A GYR (green-yellow-red) approach can be used to indicate the progress. The master schedule board should be updated by responsible parties prior to the start of the meeting each week. The progress should be indicated with a timeline and with the GYR coding making the progress of the project very visible. A suggested GYR coding is listed below:

- G – green – the project is progressing according to the prescribed Gantt chart
- Y – yellow – there is a gap or there is an anticipated gap in the project progress in comparison to the prescribed Gantt chart however the project team has a correction plan identified that will bring the project on track by the next meeting
- R – red – there is a gap in the projects progress in comparison to the prescribed Gantt chart or there is a project that was coded yellow in the previous week's meeting and has not been brought back on track

As stated above the main purpose of the weekly master schedule review is to determine if the projects are progressing according to their Gantt chart at a very high level. The master schedule and coding highlight the projects that are behind schedule so that they can receive the management attention and assistance to bring the project back on track. The highlighting of the projects is not meant to identify the project so that those team leaders and/or members can receive persecution. If this is the case the whole structure will break down due to integrity issues in the master schedule updating process. The team leaders and team members need to see the entire process as an avenue to obtain assistance on their projects. The review process consists of a management by exception. The review team acknowledges those projects that are coded R or have a Y on consecutive weeks. A short explanation of the shortcoming or issue is presented by the team leader (usually the Black Belt) at the review. A supplemental Champion project review is then scheduled.

The primary purpose for a separately scheduled supplemental Champion project review is to eliminate barriers and to apply additional resources to define a recovery plan. The Champion and Black Belt work to develop the plan that will bring the project back on track to meet the guidelines outlined in the charter project plan. If both parties agree that it is not reasonable to apply the additional resources or the slip in timing is not recoverable, than a new project plan is developed and the project charter is revised. Any changes to the project charter should only occur as a result of a conscious choice by the Project Champion and Black Belt.

Formal Tollgate Review Process

The formal tollgate review process is intended to be a systematic review occurring at the project milestones. This process is not meant to substitute the daily and weekly project management controls that are in place. The typical milestones that are reviewed are the ends of each of the phases of the DMAIC process. These formal reviews are typically performed monthly or as needed when the project has progressed through a particular phase and confirmation is required for continuance. The Black Belt and project team should not be allowed to continue work on the next phase of the project until approval is granted by the Project Champion and assigned Master Black Belt. The purpose of the reviews is to ensure that the Six Sigma methodology is being followed, that the correct technical tools are being applied and that they are being applied correctly and that the project is progressing as anticipated. The review process can be equated to a quality auditing function and thus a number of key process questions have been developed as a form of an audit checklist. The questions are listed below for each of the phases of the DMAIC process along with a purpose, deliverables and relevant tools.⁵

Define:

Goal / Purpose

- Define the project's purpose and scope
- To obtain a clear understanding of the problem to be addressed
- To identify the input and output variables
- To develop roles / responsibilities, process steps, goals and milestones
- To get the team organized
- Obtain an understanding of the project merit

Deliverables

- A well-defined problem statement, objective and a clear statement of the intended improvement and how it will be measure
- Identification of the process or product's customers
- A $Y=f(X)$ diagram or similar graphic to outline the relationship between the input and output variables
- A primary metric trend chart indicating historical performance of the process
- A high-level process map with scope designated
- A project charter
- A project plan

Relevant Tools

- Flowcharts, Pareto Charts, Time Plots, Control Charts, Gantt Charts, Project Plans, Project Charter Methodology, Communication Plans and Other Change Management Tools

Useful Questions

Before Launching the Project

HAVE YOU....

- Identified your top-level business and functional issues and priorities?
- Identified your key customers and their critical requirements?
- Identified your key processes and key deliverables?
- Done a high-level process map and $Y=F(X)$ diagram?

- Baselined these processes with existing data?
- Identified areas where you need to collect data?
- Identified your priority processes for improvement?
- Identified potential opportunities and improvement projects? Is the motivation for the project cascaded down from a corporate strategic objective?

For Each Project

HAVE YOU....

- Formulated a problem and goal statement?
- Scoped the project by identifying the process boundaries: supplier inputs, customer outputs and their requirements, constraints, and resource requirements?
- Developed the business case for the project?
- Selected the key players associated with the project?
- Prepared a project plan? (Reminder: reviews)
- Summarized the results of these steps in your project charter?
- Obtained finances approval of your intended project merit?

General Questions

- Who is on your team?
- What is causing you to do this project?
- Who is the Customer?
- What are their needs (CTQ's)?
- What is the aim of the project?
- What is the problem being rectified?
- What are the gains?
- What is the cost caused by the problem?
- What is the improvement in quality?
- What problem or gap are you addressing?
- Why is this project important?
- What are the key measures or performance indicators?
 - How are the measures or performance indicators defined?
 - How will you know if things improve?
 - What is the current performance level?
- What are the major steps of the process you will be improving
 - Who are the suppliers?
 - What are the inputs?
 - What are the outputs?
- What impact will closing the gap or solving the problem have on customers?
 - Who are the customers?
 - Are there relevant customer segments?
 - What data do you have to understand customer requirements?
- Have you developed the business case for the project?
- What measures are important to each customer segment? How do you know?
- What are the boundaries of this project?
- What are the business reasons for completing this project?
- Show me your project schedule. What project milestones have you established?
- Is the project properly scoped?
 - In the high-level process map does the project cover more than one area (possible over scope)?

- Does the project deal with a number models / products (possible over scope)?
- Does the project deal with a number of issues (possible over scope)?
- Is the project scoped to be completed within 4-6 months?
- If the project is for a new black belt, does it require the use of advanced tools?
- Prepared a project plan? (Reminder: reviews)
- Summarized the results of these steps in your project charter?

Measure:

Goal / Purpose

- To document the existing process
- To establish techniques for collecting data
- To ensure the measurement system is adequate
- To collect the data
- To establish a baseline including confirmation of financial considerations
- To display the data graphically, so that project opportunities can begin to be highlightedTo focus the improvement effort by gathering information on the current situation

Deliverables

- A more focused problem statement
- Detailed process map
- Cause and effect matrix and existing FMEA
- Cause and effect diagram
- Data collection plan with designations on the process map and a data collection form
- A validated measurement system including a gage R&R
- Sufficient data for the analysis phase
- A complete graphical analysis including pareto chart, trend charts, box-plots, histograms, scatter lots and any other graphical displays required
- Baseline primary and secondary metrics charted on a trend chart
- A baseline capability study including calculation of sigma levels

Relevant Tools

- Process Mapping, Data Collection Tools Such as Check sheets, Forms and Concentration Diagrams, Cause and Effect, Flow Charts, FMEA, Gage R&R, MSA, Graphical Techniques (Pareto, Time Plots, Control Charts, Frequency Plots, Histogram, etc.), Process Sigma Calculation and Change Management Tools

Useful Questions

- What is the process improvement?
- How does it work?
- What are the variables?
- Which affect the outcome most?
- What is the optimum improvement?
- What is the current status?
- What problem or gap are you addressing?
 - Where, when, and how often does the problem occur?
 - How severe is it?
- If appropriate, show me your flowchart or other sketch of the situation?
 - How did you create it? Validate it?
 - What did you learn from it? Is the process actually used?

- What data did you collect? How did you collect it?
 - What did you do to ensure that the data collection process was reliable and valid?
- What does the data tell you about the problem or gap?
- Show me the charts or graphs you used to analyze your data?
- What stratifying factors did you analyze?
- How did you define defect, unit, and opportunity?
- What is the current process sigma?
- Have you found any "quick hit" improvements? What is the plan for implementing them?
- Does this affect the business case? If so, how?
- Given your understanding of the problem or gap, do we need to change the charter?
- What type of data is available and how has it been collected?
- Has a measurement error study been undertaken and what are the results? Are better gauges required and what would be the cost?
- Have you completed a process map (flowchart) and who was involved in its development?
- What are the categories of defects as shown in your Pareto analysis?
- If a technology problem is indicated, what do you think it will take to improve it? Are there any other alternatives?
- What is the current defect level (PPM/DPMO) and what improvement target can we set?
- What is the capability (BZ) of the process and the probability of defects?
- What are your next steps?
- Are you satisfied with the level of cooperation and support you are getting?

Analyze:

Goal / Purpose

- To narrow the focus of the project by gathering information on the current situation
- To uncover potential sources of variation through an understanding of the relationship between X's and Y's
- To reduce the number of process variables to be acted on in the improvement phase To identify and manage high risk inputs

Deliverables

- Statistical analysis of significance of X variables with respect to Y
- Could be from a series of inference tests, regression, ANOVA and/or DoE
- A cause and effect diagram outlining the relationship between X and Y
- The root cause for the problem
- An outline of areas for the improvement to address
- An understanding of the underlying process distribution

Relevant Tools

- Process Mapping, Graphical Techniques, Operational Definitions, Sampling, Multi-vari Studies, Hypothesis Testing, Correlation and Regression, ANOVA, DOE and Change Management Tools

Useful Questions

- What inputs affect CTQ's the most? To what extent?
- Do combinations of variables affect outputs?
- Does an altered input really change the output?
- How reliable is the concluded data?

- How did you identify potential causes? Show me the tool you used and/or the data you collected?
 - If you used a cause-and-effect diagram, walk me through it.
 - If you used another tool (such as a scatter plot, regression analysis, frequency plot, hypothesis testing, tree diagram, or designed experiment), tell me what the data you collected to construct the plot. What did you conclude?
 - If you used process mapping and analysis, walk through the relevant flowcharts.
- Which of the factors turned out to be root causes or contribute most to the problem?
- How did you verify these root causes or vital few factors? How did you analyze the data? Show me your charts or graphs.
- How do you know you've gotten at root causes and not just symptoms?
- Which factors will you investigate further? How did you choose them? What graphs or statistics support your choice?
- Does identification of root causes affect the make up of the team?
- Does this affect the business case? If so, how?
- Have you found any "quick hit" improvements?
- How many significant (vital few) variables influence the process and what are they? What sources of variation have been identified?
- What is the potential contribution of each of the vital few variables?
- What progress has been made on the PPM/DPMO chart (projections and timing)?
- What tools have you used in this phase and how were they helpful?
- What interim actions have you taken to contain defects until a final solution can be developed and implemented? Has an FMEA been completed?
- What are your improvement plans and next steps to get there (including timing, responsibility and expected results)?
- What was the basis for the improvement quantification calculations?
- Are you satisfied with the level of cooperation and support you are getting?
- What other support actions or activities do you need to accelerate your progress?

Improve:

Goal /Purpose

- To verify the variable relationship
 - To identify, test and implement potential solutions to address the root cause
 - To verify the solutions are effective
 - To document the cost benefit
 - To ensure the solution is robust
- #### **Deliverables**
- Statistical analysis verifying the variable list
 - A brainstormed list of potential solutions
 - A new process map
 - Revised / new operating tolerances
 - Results for an optimization routine (i.e. EVOP)
 - Revised FMEA
 - Finalized cost / benefit analysis
 - New measurement system assessment (gage R&R)
 - New capability analysis including calculation of sigma level

Relevant Tools

- Process Mapping, DOE, Simulation, Optimization, Cost Benefit Analysis, FMEA, Stakeholder Analysis and Change Management
- #### **Useful Questions**

- How many trials are necessary to determine/confirm the optimum settings/procedures?
- Once the optimum inputs/outputs are identified, how are the parameters set to correctly implement them?
- How did you generate your potential solutions?
- What criteria did you use to evaluate the potential solutions? How do the criteria relate to the key performance measures?
- Show me your prioritization matrix.
- What potential problems, errors, or failure modes did you identify? How were they addressed?
- Which solutions did you pilot test? How did you test them? If you tested several changes, did you use a designed experiment?
- Show me the data you collected during the pilot tests. What was the impact on the root causes and key performance indicators or measures?
- Show me your cost-benefit analysis.
- Show me the plan for full implementation.
- If appropriate, show me the revised flowcharts that describe the new process?
- What steps can be taken to manage the cultural impact of the full-scale implementation? Who will be affected by the changes and how? What is being done to facilitate this change?
- Describe the business case for full-scale implementation of the chosen solution(s). How will this affect customers?
- What are the results of the full-scale implementation?
- Show me your before-and-after data. How much of the original gap was closed? How much remains?
- What is the new process sigma?
- Have the definitions of defect, unit, and opportunity changed?
- What did you do to address the technical and cultural impacts of the change?
- Was this business case realized?
- Did you identify unexpected side effects?
- What unexpected problems did you encounter? Where did you deviate from the plan? What happened?
- Have you updated your project information in Sigma Track? Let's review it.
- What progress has been achieved to date in PPM/DPMO performance? Has your chart been updated?
- Is a DOE planned and what support (time, production runs, people, etc) is necessary for it?
- What new tools have you used in this phase and how were they helpful?
- What are the possible root causes of defects? Are these included in an updated FMEA?
- What product or process design changes are required to achieve your improvement goals?
- What are your next steps toward achieving your improvement targets?
- Has Finance been involved in the project to fully understand the cost implications of your improvement plans?
- Are you satisfied with the level of cooperation and support you are getting?
- What other support actions or activities do you need to accelerate your progress?

Control:

Goal /Purpose

- To ensure the gains are sustained for the long term To eliminate new work methods and processes to ensure the gains are sustained

Deliverables

- List of Poka Yoke measures
- Formal documentation of the new method
- Reaction plans
- Updated control plan, work instructions, standard operating procedure and operator instructional aides
- Control charts with statistically driven limits
- Trend chart verifying performance at or below target for three months

Relevant Tools

- Control Plan, SPC, Gage Control Plan, Graphical Techniques, Preventative Maintenance, Poka Yoke / Mistake Proofing, Process Management Charts and Change Management Tools

Useful Questions

How are the reductions in defects maintained?

- How is the improved process institutionalized?
- What can be done to ensure continuity in the event of changes in conditions, customers, technology?
- What is the new standard method or process? How was it developed?
- How is the new method documented? Where is the documentation kept? How will employees access it?
- Who owns the process?
 - Who will maintain and update documentation?
 - Who will check to make sure that the standard methods or processes are used?
How often?
- Show me your plan for process management. What will be measured? How often? By whom? How will the data be displayed? Where will control charts be used? What action will be taken if the measurements are unsatisfactory?
- How will you transfer responsibility for ongoing monitoring to the process owner?
- What organizational systems need to change to support standardization?
- Show me your project documentation?
- What did you learn from this project about making improvements, planning, working as a team, etc? To whom should these learning's be communicated? How?
- How will the project be brought to a close? How will you celebrate your efforts?
- What other areas of the organization can benefit from your method? How might we get them to adopt the new methods or processes?
- What additional gaps did you identify? How did you document them?
- What recommendations do you have for addressing these gaps?
- Have you updated your project information in Sigma Track? Let's review it.
- What process controls are being implemented to ensure we "sustain the gains"?
- What progress has been achieved to date in PPM/DPMO performance? Has your chart been updated?
- Who should take responsibility for maintaining the process after your team has completed its project? Are these people fully aware of this and have they agreed?
- Is there a plan to revisit this process in the future to ensure the new capability level is maintained? What new measurements are in place?
- What is the expected improvement in terms of cost reduction? Has Finance been involved in the project to fully understand any cost implications?
- What new tools have you learned that were used in this phase of the project?

- Are you satisfied with the level of cooperation and support you received during the project? What should we do differently to better support the next project?
- When do you plan to have your final report completed?
- What lessons have been learned on this project and what opportunities exist for leveraging the improvements?
- Do you have any ideas for follow-up projects?

Champion and Black Belt Accountability

All of the above project management keys are predicated on an effective and efficient system of accountability for the Project Champion as well as the Black Belt. There are a number of things a Project Champion as well as a Black Belt are responsible for and without accountability, there are minimal provisions to ensure the performance of the Six Sigma projects are not affected. The Project Champion is responsible for and should be held accountable for the identification, selection, definition, scoping then prioritization of projects. Having a next-up list of important, well-scoped projects allows the Project Champion to assign the highest priority projects to Black Belts with the goals. The Project Champion is typically responsible for the overall management of all of the Six Sigma projects within their area, including providing resources, the removal of barriers and holding the Black Belts accountable to the goals specified for each project. Removal of barriers is a large part of a Project Champion's responsibilities, and enables the Black Belt's success. Barriers can be lack of team support, resources, conflicts, scoping issues, organizational roadblocks among others. In order for barriers to be identified and addressed there needs to be an open and constant dialog between the Project Champion and Black Belt.

The Champion should also be held accountable for the overall effectiveness of the Six Sigma program. The effectiveness of the Six Sigma program is usually indicated by a set of metrics developed to reflect the status. Accountability is then achieved by setting goals and objectives behind the metrics and making them part of the Champion's performance appraisal and merit review.

The Black Belt is responsible for and should be held accountable for the timely completion of the project in accordance with the project plan. This effort is the backbone of Six Sigma and all other efforts should be subordinate to the bottom line results obtained from the project work. It is important that the Black Belt feels empowered in this effort and is responsible for the identification of the project barriers so that they can be addressed working with the Project Champion in a proactive manner. The Black Belt is responsible, and should ultimately be held accountable for, the benefits in terms of cost, timing, quality and customer satisfaction that are derived from the successful completion of projects. The accountability for the Black Belt is achieved through the weekly master schedule reviews, formal tollgate review processes and ultimately tying the project performance to the Black Belt's performance appraisal and merit review.

Conclusion

As stated above, the effectiveness of Project Champions is critical to the success any Six Sigma effort. The Champion's ability to perform their role to select, scope and manage Six Sigma Black Belt projects is directly correlated to a project's success rate. This paper provides the awareness and information leading to knowledge in improving the effectiveness of Six Sigma Project Champions in their role.

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