

# LEVERAGING SIX SIGMA FOR BENEFITS REALIZATION

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## Abstract

Six Sigma methodologies may appear intimidating to the Information Technology project manager. They do not have to be, however. The author, a seasoned Information Technology (IT) project manager, completed his first Six Sigma project using the define-measure-analyze-improve-control (DMAIC) approach and discusses key tools discovered. A key learning from this project was that the Six Sigma DMAIC methodology has aspects of benefits realization. While stakeholder management and understanding what the sponsors are saying is important on most projects, it is particularly important when using Six Sigma DMAIC methodology to improve an existing process.

After introducing Six Sigma and benefits realization, the author establishes that Six Sigma tools can and should exist in the project manager's tool chest. Using a travel metaphor, the author's first-hand experience with Six Sigma is presented. The focus is on the use of key Six Sigma tools for IT projects. Once the tool discussion is complete, the paper narrows to the author's key discovery: Six Sigma data are powerful and can be a differentiator in benefits realization. By listening to the voice of the customer (VOC) and determining critical to quality (CTQ) items during the define phase, the benefits can be articulated. As data is gathered during Measure, connections can be made with the CTQ items. The benefits realization occurs organically throughout the DMAIC process and is addressed in each tollgate. Six Sigma tools can be used in a nonmanufacturing environment with the well-established techniques advocated in the *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)*—Fourth edition (Project Management Institute [PMI], 2008) to better run IT projects and garner stakeholder support throughout the project. The author advocates that IT project management professionals gain exposure to Six Sigma and benefits realization.

## Introduction

In 2008, I received Six Sigma training through my employer, Allstate Insurance, and completed my first Six Sigma project using the define-measure-analyze-improve-control (DMAIC) approach. As an IT project manager with limited first-hand knowledge of Six Sigma, I went on my Six Sigma journey thinking that Six Sigma methodologies were somewhat heavyweight and intimidating.

Now that I have completed my first project, my mindset has changed. I have learned that while Six Sigma is a rigorous approach with a strong statistical foundation, the additional rigor can be worthwhile. The extra rigor used in Six Sigma is highly focused on data. Data, when properly collected and statistically analyzed, can be utilized to explain what is happening, where there are process gaps, and how processes can be improved. Data can then be used to further showcase how benefits are attained. I learned how Six Sigma can be utilized in conjunction with project management to deliver tangible benefits to stakeholders. Six Sigma methodologies leverage tools that any project manager can utilize. What follows are key discoveries of leading a Six Sigma project and attaining benefits for project stakeholders.

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## Tools of the Trade

### The Project Manager's Tool Chest

Project management is a developing profession. In the same way that there are tools of the trade for electricians, plumbers, or construction workers, project managers need certain tools to do their job. For novice project managers working on simple projects, the tools required are a project charter, a simple schedule, a risk list, etc. As the project manager graduates to projects, programs, and portfolios of higher complexity, additional tools are needed.

### Why Six Sigma?

Six Sigma can be classified as a quality management approach. In the *PMBOK® Guide*, Section 8.1.2.8, Six Sigma is listed as a proprietary “Tool and Technique” for quality (PMI, 2008). While this is true, there actually more to it than that. In the attempt to improve quality, further tangible benefits are realized.

### Does Six Sigma Belong in the IT Project Manager's Tool Chest?

Six Sigma methodologies include a host of tools that belong in the project manager's tool chest. Getting trained in Six Sigma helps prepare the project manager by giving him or her additional tools that can be used throughout the course of the project as well as other non-Six Sigma project work.

Six Sigma has a strong foundation in statistics. Understanding the basics of statistics and exposure to statistical analysis tools can help to improve management of business stakeholders. Six Sigma tools help to graphically explain difficult concepts.

### My Six Sigma Black Belt and My Company's Commitment to It

In my case, it helped that Allstate Insurance has an established commitment to Six Sigma methodologies. This commitment includes a program of training for new Six Sigma Black Belts. In 2008, I completed the training, which included leading a Six Sigma project and using tools and techniques acquired during the training. For project managers without this available infrastructure, there are a number of commercially available training courses in the public domain that might prepare a project manager for leading a Six Sigma project.

## A Brief Introduction to Benefits Realization / Benefits Management

The key discovery for me as the project manager has been that Six Sigma methodologies are highly focused on the data, and there is power in data. Six Sigma data can be a differentiator in benefits realization. The data tell a story when properly analyzed.

### What is Benefits Realization?

*Benefits realization* is a process by which value is delivered from a program. It includes monitoring, the maintenance of the benefits, and the reporting of the benefits as they come to fruition. Furthermore, a *benefits realization plan* can be used to define the expected benefits during the

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early stages of a program and then defines the success criteria for the stakeholders (Phillips, 2009).

The Six Sigma approach that I followed set out with defining benefits up front and then utilizing measurements to substantiate the benefits.

## Benefits Realization 101

Project stakeholders decide whether to fund a project. If benefits realization does not occur, funding can and should be redirected to other more worthy project initiatives.

Every project will have some aspect of benefits realization, but the really successful projects have plans that are measurable. This is why metrics is so important. Metrics and Six Sigma work well together. To illustrate what I learned, the next section will use a travel metaphor to illustrate my experience with benefits realization and Six Sigma.

## My Six Sigma Black Belt Journey and Highlights of My Travel Journal

My first Six Sigma project can be accurately described as a journey, so the following travel metaphor can help to highlight its key discoveries.

### Packing for the Trip – Black Belt Training, Minitab, Project Team

As in any journey, it helps to be prepared. In my case, this included a Black Belt training. In order to handle the statistical analysis, I was introduced to *Minitab* software and trained on some of the basic functionality. In the same way that a global positioning system (GPS) can help a traveller find their way quicker than they might with a map, I found *Minitab* to be a timesaver.

In addition, I was the leader of a Six Sigma project team. The team combined subject matter expertise from a number of perspectives, and this helped the project to succeed: I was not alone.

### My Travel Agent – Six Sigma Master Black Belt

In the same way that a travel agent prepares a traveller for a journey, I found my Six Sigma Master Black Belt to be the perfect guide for my journey. A certified Six Sigma Master Black Belt has the benefit of completing multiple previous Six Sigma journeys, both as a leader and as an advisor. She knew where there might be problems in my journey. She was able to guide me through times when my data might not be statistically accurate, and this helped to adjust my approach. She knew what to expect.

### My Compass – the DMAIC process

The compass in terms of process methodology was to follow the DMAIC process. DMAIC stands for define, measure, analyze, improve, and control. According to Stamatis (2004), this can be referred to as the *General Electric approach*. General Electric was the company that continued the progress of Motorola and standardized the methodology. Many companies utilize this structure for process improvement projects. The DMAIC model *defines* the improvement opportunity, *measures* to assess current performance, and *analyzes* the primary contributors. After

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the process is analyzed, the *improve* phase focuses on enhancing the process, while the *control* step verifies through data that the improvement has worked.

## My Travel Challenges

As with any journey, there were challenges along the way.

### Dealing With Obstacles

The obstacles along the way included other projects, which sometime got in the way of completing the journey. In this case, it helped to have the methodology to follow and the institutional commitment to me completing the project.

### Delays

As with any journey, there were delays. In my case a key stakeholder was unavailable for 6 weeks, so we decided to reassess the project timeframe. In another case, my project sponsor was not seeing the metrics as I had hoped, so we took an alternative approach.

### Finishing the Trip with Positive Outcomes

The silver lining in this was that, with the key stakeholder being unavailable during the *measure* and *analyze* phases, it was possible to perform additional data collection. This additional data helped substantiate where best to target our improvement efforts. In the other case, where our metrics pointed in a different direction than what we had initially intended, we were able to adjust our approach based on what the data told us; this led to a positive conclusion to the project.

## Experiences to Be Repeated and Tools to Be Reused on IT Projects

The next section will highlight the tools that my project used in showcasing the benefits of measuring and improving the process. They are the key Six Sigma Benefits Rationalization tools as I saw them. (There are also numerous other benefits to Six Sigma, which are beyond the scope of this discussion.)

## DMAIC Tools for IT Project Managers

### Define

During *define*, a project sponsor may have a clear mission in mind, but not all stakeholders may understand the necessity of the project. The *define* tools listed can be leveraged to convince stakeholders that this is the correct project.

### Charter

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A project charter is a simple one-page report, presenting business information about the project. It typically includes the business case for the organization, the mission statement with the expected benefits, project plan/timeline, the opportunity statement of the qualitative and quantitative benefits to the business, scope, and team members (Kumar, 2006).

The charter is the first step in presenting the potential benefits to the stakeholders.

## SIPOC (Suppliers, Inputs, Process, Outputs, and Customers)

In addition to the charter, a high-level process flow or SIPOC can help to articulate the process being assessed.

A SIPOC (suppliers, inputs, process, outputs, and customers) diagram is a quick and easy way to help identify the suppliers, inputs, outputs, and customers for each key process. This diagram helps in a high-level format to identify process boundaries and critical items without getting into too much detail. (Przekop, 2006)

This helps define the process from which the benefits can be realized later on.

## Voice of the Customer (VOC)

Henry Ford has been quoted as saying “If I had asked my customers what they wanted, they'd have asked for a faster horse.” The VOC helps to focus the improvement effort in ways that will achieve breakthrough improvements to better serve the customer. Using the voice of the customer (VOC), business (VOB), and employee (VOE), you can develop a *master improvement story* that links and aligns multiple teams and improvement efforts to achieve quantum leaps in performance improvement (Arthur, 2007).

The VOC helps us to better understand what the stakeholder's initial perceptions are. This tool is valuable in determining pain points that can be targeted for improvement.

## Stakeholder Map

Stakeholder mapping is the process of accessing the stakeholders of the process and understanding their connection to the process and their connections to each other. When teamed with VOC, it can help to provide a holistic view of stakeholders.

## Define Tollgate

Tollgates in Six Sigma perform a similar function to those of a turnpike or toll road where one must stop to pay a toll. Unlike real tollgates, however, which now have electronic “fast lanes,” there are no passes in the Six Sigma tollgates. This is a good thing, because the tollgate provides a pause to ensure that each aspect of the phase has been completed. Moreover, from a Benefits Realization standpoint, the tollgate provides the forum to present findings, and more importantly, to solicit feedback from key stakeholders.

In each element of define, measure, analyze, improve, and control (DMAIC), there are tollgates. Each phase has subtasks for each project team to address before the team moves on to the next element of DMAIC. Within the define phase, the tollgate includes reviewing the project charter, customer's requirements, and the SIPOC (Eckes, 2003a).

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## Measure

During *measure*, the data become the focus. The project team sets about gathering data that align with the project charter. The measure tools listed are used in the data-gathering process. The data gathered here will be utilized downstream as the project moves toward improvement. The gathering of data is a key differentiator in the Six Sigma approach.

## Data Collection Plan

The data collection plan has a number of columns and covers what to measure, type of measure, type of data, operational definition, targets/specifications, etc. Data collected may be continuous or discrete (Eckes, 2003b).

There are four steps to using a discrete data collection form:

1. Determine what a defect is
2. Determine reason codes or categories of defects
3. Determine the time frame for data to be collected
4. Determine a grid for data to be collected

For continuous data, the Six Sigma project team can use a frequency distribution check-sheet. This tracks the number of occurrences for a given event for each measurement or series of measurements. The data collected can be utilized to determine baseline Six Sigma (Eckes, 2003b).

## Measure Tollgate

The measure tollgate covers the data collection plan and the gathering of the data. In some cases, the *analyze* tollgate may be logically linked to the measure tollgate. Whether done separately or with analysis tollgate, the measure tollgate provides the forum to have dialogue with stakeholders. During the dialogue, the Six Sigma core team can leverage the data collected to show whether benefits are realized through this stage of the project. If for some reason the project were cancelled at this point because the data did not reveal what was expected, future projects could pick up at this point, reutilizing the data collection plan.

## Analyze

The process of analyzing the data can proceed once a statistically accurate sample of data has been gathered. The following tools can help in benefits realization.

## Cause and Effect

Cause and effect diagrams are graphical brainstorming tools. They list causes for a given effect in an organized way to separate out potential problems and target areas for improvement. They are also referred to as *fishbone diagrams* because of their form: causes are listed on lines that branch off from the effect in much the same way that a fish's ribs branch off from its spine. They are sometimes called Ishikawa diagrams in reference to a Japanese engineer who popularized their usage for quality improvement (Keller, 2005).

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## Pareto Chart

A Pareto chart is a vertical bar graph showing problems in a prioritized order. The categories for the vertical bars represent mutually exclusive categories that are sorted in decreasing order from left to right. This chart helps to differentiate between the vital few and the trivial many. They are typically used to focus project resources on the products, departments, issues, defects, or causes yielding the highest return (Keller, 2005).

## Stratification

Stratification means to look for differences in the sources of variation observed on the output of an operation. Utilizing stratification allows one to consider these variations in the process and to analyze the data accordingly. Sorting data by variations in worker, supplier, input, machine, shift, time of day, and/or date will provide stratified information (Larson, 2003).

## Minitab and Excel

The statistical analysis on my project was made easier by the use of Minitab. I also utilized Microsoft Excel for some calculations.

The following assessment of the usage of these tools has been made by Bass (2007): "The complexity involved in manipulating some statistics formulae and the desire to get the results quickly have resulted in the creation of a plethora of statistical software. Most of them are tools that are highly effective in solving problems quickly and are very easy to use. Minitab has been around for many years and has proved to be very sophisticated and easy to use. It has also been adopted by most Six Sigma practitioners as a preferred tool. The statistics portion of Microsoft Excel's functionalities does not match Minitab's capabilities but because it is easy to access and easy to use, Excel is widely used by professionals.."

## Analyze Tollgate

As previously mentioned, the measure tollgate may be combined with analysis on smaller projects. On larger projects with extensive data, the analysis phase deserves its own tollgate. It is in this tollgate that the data continue to tell the story, utilizing the tools of Six Sigma to distinguish the most important data for future decision making.

## Improve

The *improve* phase is where all the data collection and the collective knowledge of the Six Sigma team come together in real value to the customer. This step is both art and science in that while the data guides the improvements, it is the subject matter expertise of the team that leads to benefits rationalization

## Brainstorming and Consensus

Brainstorming during the *improve* phase allows the team to create a list of new ideas or options for a task or solution. Participants are encouraged to share ideas using the data that are found as the foundation for brainstorming. "Creativity should be the primary goal. Often someone will share an idea that isn't quite right, but a co-worker may add to it or alter it. Together they create a perfect

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initial thought and come up with a unique plan, solution, or idea that works. This technique encourages collaboration within the organization and helps build a culture of creativity” (Przekop, 2006).

Consensus is reached not when everyone agrees with the chosen solution, but rather when they can collectively support it as the best course of action.

## Implementation Plan

An implementation plan outlines the steps that will be taken to implement the improvement. This includes the resource plan to transition the implementation from the Six Sigma team to the operational team, which will ultimately implement the changes.

## Improve Tollgate

The improve tollgate is where all the hard work comes together to be shared with the stakeholders. A key aspect of this is to ensure tight alignment with the project sponsor before the tollgate to ensure that benefits have been realized.

## Control

### Control Plan

The control plan is created “to ensure that processes are run so that products or services meet or exceed customer requirements at all times. It should be a living document that is updated with both additions and deletions of controls based on experience from the process. A control plan may need approval of the procuring organization(s). A control plan offers a systematic approach to finding and resolving out-of-control conditions” (Breyfogle III, 2003).

### Four Block

The *four block* is a graphical tool that lists the problem statement, key learnings, successes, and financial / nonfinancial impacts in separate blocks. The one-page nature of this tool makes a great one-page executive summary for the project. Even though it is not complete until the end of the project, it is a living document that evolves with the discoveries of the project.

### Control Tollgate

The control tollgate brings closure to the project and ensures that the benefits are realized.

## The Intersection of Benefits Realization and Six Sigma

The power of Six Sigma using the DMAIC approach is that the data “tell the story” as to whether or not the endeavor was worthwhile.

## Tying Critical to Quality Items to Benefits

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Early on in the DMAIC process, the items most critical to quality (CTQ) are determined. These CTQ items are often determined during VOC and stakeholder mapping. These CTQ items are tied to the benefits gained during the improvement phase. This consistency and traceability underlies the benefits realization seen on Six Sigma projects.

## The Power of Six Sigma Data

By the conclusion of a Six Sigma DMAIC project, financial and nonfinancial impacts are determined and improvements are made where necessary based on statistically valid samplings of data. The data provide the rationale for improvement. This is the *science* of benefit realization on Six Sigma projects—statistically accurate data speak.

## Tollgates and Stakeholder Management

Tollgates facilitate structured dialogue between the Six Sigma project team and the project stakeholders. Above and beyond the tollgates, the project sponsor and Six Sigma project team are in conversations throughout the project to minimize surprises and manage the stakeholders. The techniques utilized in Six Sigma for stakeholder management can be extended to other non-Six Sigma projects as well. This is the *art* of benefits realization on Six Sigma projects—stakeholders *feel* connected throughout the project.

## Conclusion

When a methodology appeals to both the right (artistic) and the left brain (logical), it can be powerful. Six Sigma DMAIC approach does just that. The data gathered seem logical for those who need logic. Similarly, the structured dialogue with the stakeholders and VOC interviews provide a chance for the stakeholders to feel that the Six Sigma team understands their concerns before going about fixing them.

In conclusion, Six Sigma tools can be used in a nonmanufacturing environment with the well-established techniques advocated in the *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)* (PMI, 2008) to better run IT projects and garner stakeholder support throughout the project.

IT project managers who are serious about benefits realization should gain exposure to Six Sigma tools and techniques and learn to leverage them on their projects. In part or whole, the Six Sigma tools can be utilized.

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