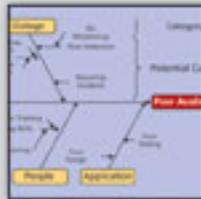
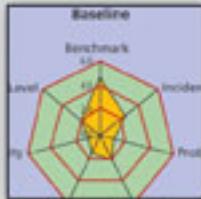
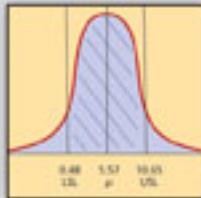


Six Sigma for IT Management



Six Sigma for IT Management

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Six Sigma for IT Management



Colophon

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Foreword with the 3rd impression

It is with utmost pride that I write these words as the Foreword of this book. The release of the already third impression of Six Sigma for IT Management is another quantum leap in getting business process improvement to both IT Management and Management in general.

Six Sigma as a method is now mature. It is time to forge the strengths of Six Sigma with ITIL®. Not an easy task - implementing Six Sigma in your organization can be quite impressive on its own. Despite the continuous improvement cycle in later versions of ITIL®, our daily practice shows the need for Six Sigma best practices to make business process improvements truly happen.

I am convinced that this book will give you guidelines and examples on how to become more efficient in IT and business processes, so creating a helpful tool to be more successful and create added value for your customers.

An international team of authors has worked on this book and through their efforts dedication, the objective has been met – to create added value to the community of Management, by enabling the development of a common practice that supports current IT-standards and processes.

Maybe even more important, the authors have provided their vast amount of experience and share it with you. This team has proven to be “one of a kind” and it was an honour to be part of it.

On behalf of my co-authors I wish to thank Van Haren publishing for their support and participating in making this third impression possible. I hope you will find just as much of a discovery tour in reading this book as we did in writing it.

The field of Business Process Improvement continues to develop and so will this book.

Sven den Boer,
Lead Author

Endorsement Statement

It is perhaps coincidence that Six Sigma was created about the same time as ITIL. But the reasons for that are not purely coincidental. They emerged to satisfy a need for formalizing service practices and to streamline and eliminate defects from how we manage business processes.

Since then Motorola, the company that created Six Sigma and the CCTA who created ITIL have seen these practices grow to global acceptance. We have also seen the emergence of confusion about what each are, if they are different and whether an organization should consider using both.

The answer to this question will become clear in the pages of this book. The 'Six Sigma for IT Management' book is a perfect addition to your ITSM library. It clarifies the intended objectives of ITIL and Six Sigma, and provides valuable insights for why they co-exist and how you can leverage the power of synergy between them.

Whether or not you are considering or have already been using both frameworks, this book will be a great source of reference to you.

As the Chair for the itSMF International Publication committee (IPESC), I am very proud to officially add our Committee's formal endorsement of this publication.

The IPESC, through its council of members, their efforts and dedication create added value to the community of ITSM professionals, by endorsing the development of a common global library which supports a uniform standard of ITSM best practices and knowledge.

Our endorsement process is a rigorous one, with stringent criteria that any ITSM-related publication may meet before it can be endorsed by the IPESC.

On behalf of the ITSMF global community, I wish to thank the IPESC for their efforts and endorsement of this book.

I know that you will find it informative and a valuable addition to your ITSM library in support of your journey toward service excellence.



Chair, International Publications Executive Committee
itSMF International

Acknowledgments

The use of Six Sigma as a process improvement methodology is growing fast in a wide variety of businesses. Eventually those businesses will ask their IT departments to apply the Six Sigma philosophy to IT processes as well. However, the existing literature provided only limited information on process improvement techniques, indicating a gap in the global library. For this reason ITSMF-NL, the Dutch chapter of the IT Service Management Forum, started a project to document a set of best practices on IT process improvement using Six Sigma.

The project started with a worldwide Call for Authors and Reviewers. We are very proud to have been able to compose a truly international authors team, having broad experience in both Six Sigma and IT Service Management:

- Sven den Boer (Lead Author) - ProjectsOne, the Netherlands
- Rajeev Andharia - Sun Microsystems, India
- Melvin Harteveld - ProjectsOne, the Netherlands
- Linh C. Ho - Proxima Technology, USA
- Patrick L. Musto - ITSM Process Architect, USA
- Silvia Prickel - Agilità, USA.

Sven den Boer volunteered to be Lead Author of the team and also participated in the selection of the Co-Authors. Sven is a trained Six Sigma Master Black Belt, was extensively trained in ITIL, and has broad experience in globally implementing Business Process Improvement methodology (e.g. Six Sigma & Lean) within Getronics. Sven is co-founder and Managing Director of ProjectsOne.eu. Besides his broad experience in Business Process Improvement, Project and Programme Management, he is a specialist in Change Management being a professional Coach “Don’t try changing people, help them to change themselves”. Sven focused on the development of the integrated book, and did his very best to manage the workload of the team. We owe him many thanks for his persistent commitment to this task and the effort he spent.

His colleague and co-author Melvin Harteveld is a certified Master Black Belt. Melvin has a broad experience in improving business processes with the help of Six Sigma and Lean within Getronics, thus saving millions of dollars. Melvin became co-founder and partner of ProjectsOne.eu, a prime Business Process Improvement company, based in the Netherlands and working throughout Europe. As a certified Master Black Belt and Six Sigma Programme Manager, he has an in-depth knowledge of the Six Sigma improvement theory and the use of statistics to measure and improve processes in general. Melvin is famous as a trainer both in the classroom and on the Job, he is also co-responsible for creating and developing Smart Process Management TM©®.

A number of very promising responses was received from the Call for Authors. Selection of the authors was difficult, since there were several highly competent candidates who volunteered for the task. After thorough discussion with these volunteers, emphasizing the required commitment, we managed to build a very strong team of expert co-authors.

Linh C. Ho is the Marketing Director at Proxima Technology where she helped Proxima become the first Service Management software vendor to combine Six Sigma with Service Management. She manages Proxima's client reference program where she works with customers that utilize Six Sigma in service delivery and support. Linh has also written articles and spoken at conferences on integrating these two approaches. Linh holds a Honors Baccalaureate in Commerce; International Business Management and Management Information Systems from the University of Ottawa, Canada. Linh wishes to thank the support of Owen Berkeley-Hill (Ford Motor Company), Tim Young (Netezza), Steve Jones (Proxima Technology), Bryce Dunn (Proxima Technology), Dr. Jean Couillard Ph. D. (University of Ottawa, Canada) and Jon Efford (Plan-Net).

Silvia Prickel joined the team as a certified ITIL Service Manager, BS 15000 consultant and Six Sigma Black Belt. Silvia is a lead IT Service Management Consultant for Agilità, now part of ITpreneurs. She has more than twenty years of IT experience and was selected as the 'Best of the Best' Black Belt by the American Society for Quality (ASQ) in 2001. As a Practitioner and Consultant, Silvia implemented ITIL and Six Sigma at several organizations.

From another side of the world came Rajeev Andharia, a Project Management Professional (PMP), Certified Information Systems Auditor (CISA) and a Certified Information System Security Professional (CISSP), who had more than eleven years of experience in IT consulting, project management and execution. Rajeev is familiar with many frameworks, among them ITIL and Six Sigma. The force behind Rajeev's contribution was the unwavering support of his friend and wife Shital. An MBA herself, Shital is an IT professional specializing in training and consulting. In addition to providing valuable inputs and quality reviews, Shital supported by spending weekends with Rajeev to create the chapter on IT process improvement.

Patrick Musto joined the team as an ITSM Process Architect, Consultant, Practitioner and Trainer, who has over 25 years of leadership in marketing research, customer service and business process improvement. Patrick holds an MS in information and communication sciences, a Six Sigma Belt and is Master's certified in the Information Technology Infrastructure Library (ITIL) service management framework. He has demonstrated experience in Business Process Improvement and process design and management and has served as a quality lead for a shared services implementation and as a process architect for a Service Oriented Architecture (SOA) project.

The team spent a great deal of energy on creating and peer-reviewing the various draft texts, supported by Tienke Verheijen who acted as the expert editor on behalf of ITSMF-NL. Tienke spent numerous hours making sure that all details were taken care of, and that quality was assured.

A very important role was played by the review team. This team was composed of a wide variety of professionals from all over the world:

- Rolf Akker - Atos Origin, the Netherlands
- Tercio Anunciado - CNH Latin America LTDA, Brazil
- Tim Ganguly - JPM-Guardian Installation Protection Program (IPP), USA
- Andreas Gräf - Hewlett-Packard GmbH, Germany

- Kadri Hasbay - Gap Inc, USA
- Steve Jones - Proxima Technology, USA
- Nari Kannan - Ajira Technologies Inc., USA
- Ricardo Mansur - Empreendimentos Mansur, Brazil
- Alex Tito de Morais - Fujitsu, Brazil
- Sandeep Narang - Pepperweed Consulting, USA
- Peter Ober - Hewlett-Packard GmbH, Germany
- Ulrich Erik Redmann - Vattenfall Europe Information Services GmbH, Germany
- Mart Rovers - InterProm USA Corporation, USA
- Adam Schlesinger - Microsoft Corporation, USA
- Steve Tremblay - Excelsa Technologies Consulting Inc., Canada
- Peter Westerhof - Compulegal.nl, the Netherlands
- Tim Young - Netezza, USA

Together, they raised about seven hundred issues that were all taken into account by the editor and the authors team. In this way, we hope we have achieved best practice in the truest sense of the word, having lots of experts contributing their 'private best practice' experiences, and merging these into a consistent whole.

The overall editorial process was led by Jan van Bon, who managed to find an excellent author team and who coordinated the first steps toward the book. He also made sure a thorough review process was applied to the various drafts.

Given the desire for a broad consensus in the IT Service Management field, new developments, additional material and other contributions from IT Service Management professionals are welcomed to extend and further improve this publication. Any forwarded material will be discussed by the editorial team and where appropriate incorporated into new editions. Any comments can be sent to the chief editor, email: jan.van.bon@itsmf.nl.

Introduction

Delivering high quality IT services at minimum cost to the business continues to be a priority for IT executives. Organizations have looked to combine ITIL® and other quality methodologies such as Six Sigma to address performance requirements. Today people expect IT to have the same reliability as the utility providers such as electricity, but at the same time IT is considered a black hole or a cost center. Because IT has become such an integral part of the business and its critical business processes, the need to align the business objectives with IT is crucial.

The question is: how? How can IT be the enabler to improve the business and its processes? How can IT prove its added value to the business? This is where quality improvement methodologies such as Six Sigma and best practices like ITIL can help bridge the gap between IT and the business. Moreover, combining these approaches helps IT to focus on strategic activities supporting business goals instead of dealing with day-to-day operations reactively.

This book gives an appreciation and insight into:

- what Six Sigma and ITIL (V2)¹ are
- the differences between ITIL and Six Sigma
- how these two approaches benefit IT and the business
- when to utilize them
- why IT managers should consider these approaches
- who should use Six Sigma
- practical techniques enabling IT professionals to immediately apply them in their IT organization
- common challenges to be aware of and mistakes to avoid when implementing Six Sigma.

As you attempt to drive your organization towards improvement, you are also responsible for choosing a method that will achieve that goal. You need to make continuous performance improvement part of your strategic activities and identify a methodology that enables you to meet and exceed these goals. But which approach will best help you to do so?

Six Sigma does not have a specific IT focus to begin with, as its origins lie in manufacturing organizations. It does, however, provide a consistent framework for measuring process outcomes, whether services or products. Six Sigma is very useful in complementing the IT Infrastructure Library (ITIL) process approach, the de facto standard for managing IT organizations nowadays; the ITIL approach does not focus on such tangible and statistical metrics.

ITIL defines the 'what' of Service Management and Six Sigma defines the 'how' of process improvement.

Together they are a perfect fit for improving the quality of IT service delivery and support. The Six Sigma approach is unique in not only providing measures of process outcomes, such as correlation diagrams and process charts, but also prescribing a consistent approach in how to use these metrics: the guidelines that describe Defining, Measuring, Analyzing, Improving and Controlling (DMAIC).

¹ When ITIL is mentioned, ITIL V2 is referred to.

Taking a focused and disciplined approach to the investment in an integrated improvement system that ITIL and Six Sigma together represent enables you to fully exceed your expectations - and those of your customers. The 'Design for Six Sigma' approach in this book is just one approach; every organization has to decide on how to implement its own. For improving existing services, DMAIC is the recommended approach.

This is the first book to provide a coherent view and guidance for using the Six Sigma approach successfully in IT service organizations. It particularly aims at merging ITIL and Six Sigma into one approach for continuous improvement of IT service organizations.

After this general introduction to the book, and to the Six Sigma and ITIL methodologies, the first chapter will explain the reasons for using Six Sigma in IT Service Management organizations.

Starting with a short background to TQM, it explains why Six Sigma is the most appropriate approach to be used in IT service organizations. The second chapter describes the principles of Six Sigma, and the third describes ITIL. Then, a case study about the successful use of Six Sigma in a large European bank shows how Six Sigma was applied to a critical business service. Chapter 4 goes more deeply into combining ITIL with Six Sigma, followed by a case study showing how not to use Six Sigma in your IT Service organization. Chapter 5 describes advanced techniques on aligning continuous IT process improvement with the business, using the IT control approach, and Chapter 6 gives you practical ideas on the use of Six Sigma in seven specific IT Service situations.

Six Sigma

What is Six Sigma?

There are many different perceptions of Six Sigma. We have listed some common misunderstandings and their counterparts in Table 0.1.

It's not:	It is:
Flavour of the Month	Exists since 1986
Expensive with fuzzy returns	Delivers bottom-line impact (GE \$15bn)
Confined to manufacturing	To improve any business process
Limited to cost-cutting	Starts & ends with customer
One-off initiative	All about Continuous Improvement

Table 0.1 What is Six Sigma?

The method owes its name to the letter sigma. In statistics, this letter represents the standard deviation, which indicates the amount of variation or inconsistency in a process. In the mid-eighties, the management of Motorola introduced statistical measurement of its process outcomes. The measure of six times sigma, Six Sigma (meaning that in every million opportunities there are only 3.4 defects) was seen as a process outcome with an acceptable amount of variation.

The sigma measure, σ , represents the standard deviation. Six Sigma means six times sigma, indicating 3.4 defects per million opportunities (DPMO).

The Six Sigma method does not insist that every organization should strive for six sigma or 3.4 DPMO. It does provide a quantitative methodology of continuous (process) improvement and reducing costs, by reducing the amount of variation in process outcomes to a level suitable for the given organization. It pursues data-driven, fact-based decision-making in which decisions are tied to corporate objectives. It uses an implementation of measurement-based strategy that focuses on process improvement and variation reduction. In this book, we aim at improving (IT) processes, but this does not mean Six Sigma cannot be applied in other ways.

By using a statistical approach, Six Sigma accounts for the quality assurance part of quality management. The **DMAIC** quality improvement cycle can be seen as the continuous improvement part of quality management:

- Define
- Measure
- Analyze
- Improve
- Control.

Each of the DMAIC phases has clear objectives, tasks, and techniques. These are explained further in Chapter 2. At some companies an additional Reporting step is added to the model, Though this is not a formal part of the Six Sigma DMAIC model, it is obvious that reporting should take place in a structured way. This will also create exposure and enable you to share your success.

With the quality assurance covered by the statistical measurement approach and the continuous improvement covered by the DMAIC-cycle, you might conclude that Six Sigma is a Total Quality Management approach. This is explained further in Chapter 1: Why Six Sigma for IT Service Management?

Why Six Sigma?

Six Sigma enables organizations to streamline their processes by reducing the number of defects or the amount of waste, and to raise their customer satisfaction.

Figure 0.1 shows a process outline and the waste in a process: things that are not done right the first time take extra time to put right. The rework can be seen as waste, as it should not be necessary to do a certain task twice.

By showing where the waste and/or rework (the hidden organization) comes from in a given process, Six Sigma helps management to make decisions: what parts of a process should be improved and how?

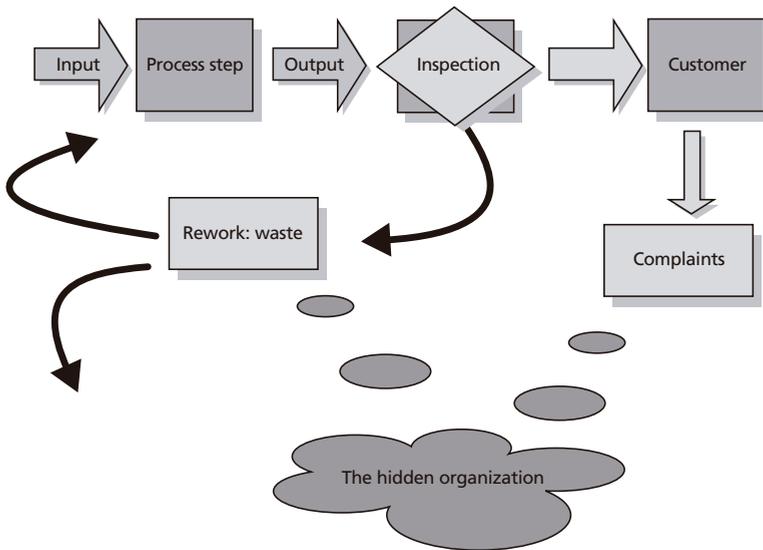


Figure 0.1 Waste in an organizational process

By first detecting, tackling and solving the issues that affect the business most, the value of an organization is increased just where it can be increased most. On average companies spend twenty per cent of their revenue on the hidden organization, but a company at Six Sigma level in its processes spends significantly less.

Thus, Six Sigma will allow you to prove success in a project from its start, through the use of consequent measurement. This gives the project manager (and his team) the ability to communicate project success right from the beginning, which provides a very good starting point. No other methodology has this huge potential.

Six Sigma will also help you to grow your organization's skill set, as it will reveal weaknesses and offer you tools to close the gaps.

Who should use Six Sigma?

Six Sigma has been deployed differently by various organizations. The financial industry, for example, focused on the core business processes, as these are nearly the same for all market players of this segment. Pharmaceutical companies, driven by the regulations of the Food and Drug Administration (FDA), implemented Six Sigma to control their activities in this area. The government sector started Six Sigma activities a little later but these go through their whole organization.

The techniques of Six Sigma can also be applied to identify and improve critical (IT) process areas. Six Sigma forces you to turn a process or organizational problem into a statistical problem that can be measured (Figure 0.2). These measurements give management information to base their decision on an operational solution for the problem. Using this approach, at Six Sigma level, organizations are spending less than five per cent of revenue on what we call the hidden organization (Figure 0.1).

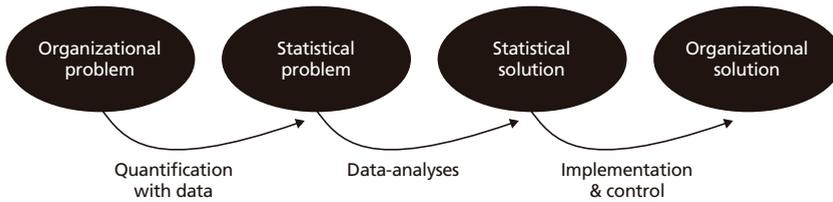


Figure 0.2 Fact-based decision making

How to use Six Sigma

In a number of cases, Six Sigma has become a tactical project focus on improvements using DMAIC methodology. In this situation, Six Sigma is viewed as a short-term ‘quick win’ and acceptance of the philosophy is never realized. When Six Sigma is deployed correctly, it does not end; it becomes a way of life, thus ensuring the best results for any organization. The Continuous Improvement ideas of Juran and Deming reflect this idea and will be introduced in the next chapter.

ITIL

ITIL was developed in the 1980s, by the British government’s Central Computer and Telecommunications Agency (CCTA)². It was based on the premise that spending on IT in government was becoming too high and a method to establish best practice processes for IT Service Management would be of benefit. With such a method, everyone would manage the IT infrastructure the same way and simplify processes thereby increasing efficiency and (eventually) driving down cost. The ITIL framework was widely adopted throughout the world and became the de facto standard for IT Service Management.

It is a framework of best practices that can be used to assist organizations in developing their IT Service Management (ITSM) process-driven approaches. ITIL recognizes five principal elements in providing IT services:

- Business Perspective
- Application Management
- Service Delivery
- Service Support
- ICT Infrastructure Management.

Service Delivery and Service Support are the most widely adopted elements. They are explained further in Chapter 3: What is ITIL?.

Aligning Six Sigma with ITIL

Though Six Sigma and ITIL are often used independently, this book aims at combining the best of both worlds, by using the process approach from ITIL and the improvement model from Six Sigma.

² Now known as the Office of Government Commerce (OGC).

In this respect we can distinguish four types of organizations:

- organizations using both ITIL and Six Sigma
- organizations using ITIL without using Six Sigma techniques
- organizations using Six Sigma but not using ITIL
- organizations using neither approach.

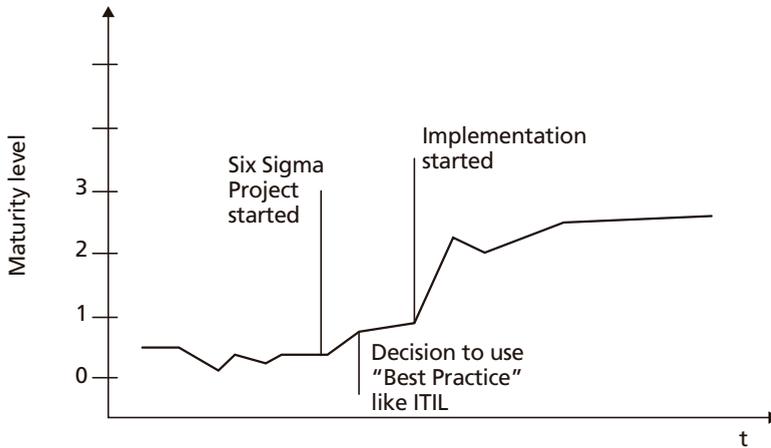


Figure 0.3 ITIL as a booster in a Six Sigma Project

Figure 0.3 shows an IT organization that is on a maturity level between 0-1, when they decided to improve by using Six Sigma as a methodology. After measuring they found data showing that the daily operation was not stabilized. Instead of trying to reinvent processes to improve them, a best practice model like ITIL can save time, money and prevent making mistakes. The combination of identifying the causes with Six Sigma and solving the issues with the help of best practices (ITIL) is an ideal way to proceed. In due turn, organizations that already use ITIL have a huge advantage when starting Six Sigma, as they already have the processes in place that need to be improved.

Though both methods are applied for improvement purposes, they have rarely been combined in practice. This book is written in a way that people who know ITIL well can skip Chapter 3. Similarly, people can skip the Six Sigma chapter (Chapter 2) if they are familiar with it. There is also a plethora of resources for both subjects available in book stores and the Internet for those who require more detailed information.

ITIL best practices can be placed within the DMAIC model; some are easy, and some are difficult, as will be explained in Chapter 4. ITIL provides a set of best practices to deliver and support IT services, but it does not define the quality of your performance or how to improve it. Though it does urge IT Service Organizations to have a Service Improvement Program (SIP), it does not explain how they should operate such a program in practice.

Questions such as “How do I collect data?”, “What data should I collect?” and “How can I draw any conclusions from them?” are not answered. The *Planning to Implement Service Management book* even names Six Sigma as one of the TQM approaches to process improvement that are complemented by the use of ITIL Service Management processes.²

Common Six Sigma techniques used in ITIL environments are Service Improvement Program (SIP), Voice of the Customer (VOC), Pareto charts, Failure Mode and Effects Analysis, control charts and process sigma value. SIP is already embedded in both Six Sigma and ITIL. More on this can be found in Chapter 5: Process improvement opportunities, techniques and practical tips.

In order to combine or merge ITIL and Six Sigma into one single approach, the two need to be aligned. This alignment should be approached as a project, in the same way as you align IT with business objectives. The best approach will be explained further in Chapter 4. Of course you should always take your organization’s culture into account, together with the process and investment aspects.

Lastly, reduce but do not stop with your Management by Sensing Around (keep ears and eyes open to what people from your organization are experiencing). You do not need to be an Einstein to understand both ITIL techniques and Six Sigma techniques. They may look more complicated than they actually are: Six Sigma uses basic arithmetical operations such as plus, minus, divide and multiply.

More on this can also be found in Chapter 6: Best practices of applying Six Sigma in ITSM, and the two case studies showing how to (and how not to) apply Six Sigma in your IT service organization.

Summary

Businesses nowadays see IT almost as a commodity: they take well functioning IT for granted and expect the IT department to be as reliable as possible, and even to be profitable. Growing attention for this development has over the years facilitated support for IT Service Management frameworks like ITIL, that have documented the processes that keep an IT department going.

Though these frameworks gave businesses a good insight in what was going on in their IT departments, they failed to indicate how well they were performing. Therefore, organizations have been looking for approaches that can facilitate the performance measurement of their processes and outcomes.

Such a quantitative approach can be found in the Six Sigma methodology, with its data-driven, fact-based decision-making, in which decisions are tied to corporate objectives. It forces organizations to turn a process or organizational problem into a statistical problem, followed by a statistical and operational solution. Through its Define, Measure, Analyze, Improve and Control (DMAIC) guidelines it provides a coherent method for analyzing ‘how’ your processes are actually running.

Moreover, the Six Sigma approach is also very good at first detecting, tackling and solving the issues that affect the business most, thereby increasing the value of an organization just where it can be increased most.

Thus, ITIL and Six Sigma are complementary. ITIL provides a framework for IT Service Management based on a set of best practices to manage IT services ('what'). Six Sigma gives you a combat proven set of statistical tools to measure and improve service quality ('how'). The merged ITIL-Six Sigma approach can help organizations to improve the quality of IT service and to raise customer satisfaction. In this way, they can improve and expand their business, and increase the business bottom line by increased revenues.

Whether you work in an organization that already follows ITIL guidelines or the Six Sigma approach, or neither of these, aligning Six Sigma with ITIL should always be treated as a well-planned project. The organizational culture should be taken into account and through a clear and honest communication, commitment should be grown.

However complicated starting with Six Sigma and ITIL may seem, please keep in mind that in the end they come down to applying common sense. A focused and disciplined approach to investment in an integrated improvement system that ITIL and Six Sigma combined represent will enable you to exceed your expectations - and those of your customers.

1 Why Six Sigma for IT Service Management?

“It is not the strongest of species that survive, nor the most intelligent, but the one most adaptable to change.” (Charles Darwin 1809-1882)

1.1 The rise of Total Quality Management

Business success is tied to an ability to deliver against mounting expectations of an increasingly demanding client base. It entails understanding their perspective on quality and value and ensuring that the service is designed and managed to meet that perspective. An IT-enabled service is only sustainable if there is a focus on the viability of the relationship between the supplier and the ultimate beneficial customer. The IT service organization is an organism that must ‘adapt’ to these needs in order for the business to ‘survive’.

This chapter looks at the history of TQM and the birth of Six Sigma. We will then see how Six Sigma when coupled with IT Service Management is a powerful breakthrough for business and IT process management.

1.1.1 What is Total Quality Management (TQM)?

Total Quality Management is a generic term used to describe a vast collection of philosophies, concepts, methods, and tools - among them, Six Sigma.

While trying to define Total Quality Management, let us start with defining *quality*. From a business perspective, quality refers to the extent to which a given service fulfills the requirements and expectations of the customer. To be able to provide quality, the supplier has to continuously assess how the service is experienced and what the customer expects in the future.

“Quality is the totality of characteristics of a product or service that bear on its ability to satisfy stated and implied needs” (ISO-8402).

The realization of the need for quality in an organization is where Total Quality Management enters the picture. From the beginning of the twentieth century, with the industrial revolution as its main driver, companies have been trying to control the quality of products their organizations were producing. Total Quality Management has been developed to introduce quality into organizations.

The birth of TQM came after World War II, when several statistically oriented scientists were sent to Japan to help rebuild the economy. Among them were W. Edwards Deming and Joseph Juran, who both contributed tremendously to the development of TQM techniques.

Juran established three fundamental concepts of Total Quality Management:

- customer focus
- continuous improvement
- value of every associate.

Deming introduced his famous ‘Plan Do Check Act’ (or ‘Plan Do Study Act’) cycle, thus emphasizing the importance of continuous improvement. This cycle and the three Juran concepts are discussed below.

Customer focus

At first glance, this concept seems obvious. After all, organizations exist to provide goods and services to customers. In fact, many companies today strive to create products and services customized to individual tastes. The real challenge, however, is not the measuring of customer satisfaction, but linking these measurements to the actual satisfaction and behavior of the customer. Customer satisfaction surveys of 4.3 out of 5 mean nothing. What truly matters is whether satisfaction rating is creating business or losing business.

For example, people often fly with a specific airline because of the frequent flier miles that can be redeemed, and not for its excellent service. So, while an airline may have more comfortable seats or even a more flexible schedule, it is the frequent flier points that influence the final decision.

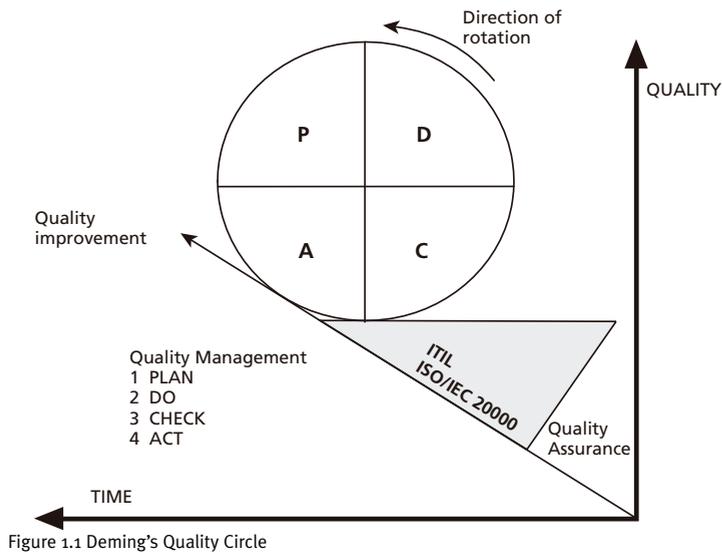
A continuous dialogue with the customer is essential to refine the services and to ensure that both the customer and the supplier know what is expected of the service. But how is this done? How do we determine which criteria influence a customer’s decision? How can we ‘measure’ whether we are really meeting customer needs and requirements? This will become evident when we discuss Critical to Quality factors in section 1.1.3.

Continuous improvement

Realizing that quality is ever-changing and maturing, the concept of ‘continuous improvement’ has become an important part of TQM. Deming’s Quality Circle proved to be a simple and effective model to control and improve quality.⁴ It revolves around four principles of: *Plan, Do, Check, Act* (PDCA). Using PDCA in a continuous cycle of improvements over time allows an organization to continuously mature its ability to drive quality in the services delivered:

- **Plan** - what should be done, when should it be done, who should be doing it, how should it be done, and by using what?
- **Do** - the planned activities are implemented
- **Check** - determine if the activities provided the expected result
- **Act** - adjust the plans based on information gathered while checking.

⁴ Edwards Deming has been inspired by Walter Shewhart, one of his teachers already advocating a “Learning and Improvement cycle”. The PDCA-cycle of Edwards Deming is also known as the PDSA-cycle, which stands for “Plan Do Study Act”. In this case, the results are studied instead of checked.



Value of every associate

Joseph Juran emphasizes the fact that employees influence change. When empowered, they can become the greatest asset for improving quality. Empowering people improves employee satisfaction. Employee satisfaction improves productivity. A productive workplace provides for innovation. Innovation fosters success!

Total Quality Management must consider the 'people' aspect of the equation and often this emanates within the culture of the organization. The term 'culture' refers to the values and beliefs of the organization. It is the way that people deal with each other in the organization; the way decisions are made; the attitude towards their work, customers, suppliers, colleagues and peers.

Influencing the culture to value 'quality' requires leadership in the form of a clear and consistent policy. It communicates to each employee how and to what extent their tasks contribute to realizing the objectives of the organization. Empowerment determines the extent to which employees can be held responsible for the quality of their work. Once clear and concise policy and expectations are communicated, employees can be accountable for carrying out those responsibilities. Continuously developing and educating employees is part of the continuous improvement process.

1.1.2 The birth of Six Sigma for TQM

How do you measure quality and value? TQM measured quality as discrete functions. It was the link between quality and metrics from a holistic perspective that led to development of Six Sigma.

Organizations need ways of measuring value. Measurements carry relevance to every customer, every activity and every employee of an organization. The foundation of Six Sigma uses metrics to calculate the success of everything an organization does.

Six Sigma focuses on Critical to Quality metrics from an end-to-end perspective, allowing for a total quality picture focused on the product as well as the processes within the operation that produces the product.

As a result, Six Sigma produced quality with far superior financial results than other TQM approaches. Companies that have implemented Six Sigma such as Allied Signal, General Electric, Sony, Honda, Maytag, Canon, Hitachi, Lockheed Martin, and Bombardier have seen significant financial results and improved customer service. In general, companies that implement Six Sigma will experience:

- up to 20 percent margin improvement
- a 12-18 percent increase in capacity
- a 12 percent reduction in the number of employees
- a 10-30 percent capital reduction.

1.1.3 What is Six Sigma's secret of success?

The production of a product, whether a tangible product like a car or a more abstract product such as a service, consists of a series of processes. All processes consist of a series of steps, events, or activities. Six Sigma measures every step of the process by breaking apart the elements within each process, identifying the critical characteristics, defining and mapping the related processes, understanding the capability of each process, discovering the weak links, and then upgrading the capability of the process. It is only by taking these steps that a business can raise the 'high-water mark' of its performance.

Once the processes are broken down into various elements through data-flow mapping, the Critical to Quality characteristics (CTQs) become apparent. These CTQs define the output of the individual processes. Once the CTQs are defined and quantified, then the variables (inputs) that affect the CTQs can be adjusted accordingly.

The key at this point is in determining which variables have the greatest impact on the outcome. This is also statistically accomplished through 'Design of Experiments' and 'Probability'. Once the key variables (X) are identified and defined, measures can be taken to optimize and control. The methodology for managing this is through Six Sigma's DMAIC (Define, Measure, Analyze, Improve, Control).

It is important to note that Critical to Quality (CTQs) translates to 'Critical to Satisfaction' from the customer's perspective. Improving CTQs therefore requires linking to customer needs (Figure 1.2).

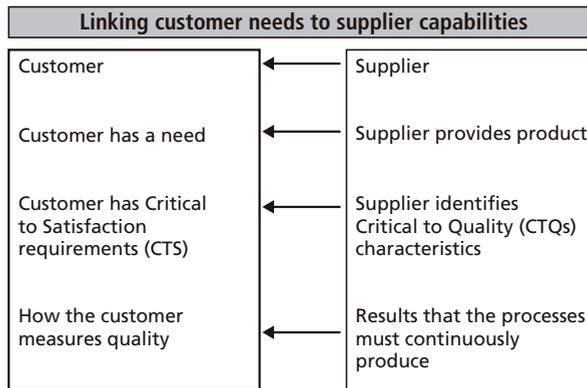


Figure 1.2 Linking customer needs to supplier capabilities

Six Sigma also focuses on eliminating variations within the process. Variables must be controlled so that they are predictable, repeatable and consistent. This not only ensures continuous customer satisfaction, but significantly reduces operating costs. The goal should be to create a defect-free process that is so predictable and repeatable that every output is an exact duplicate of the previous. There are no variations. This is the definition of a Six Sigma operation.

In summary, Six Sigma is the measurement of processes used to deliver a service or a product where critical-to-quality factors are optimized and brought under control in order to meet or exceed customer satisfaction.

1.1.4 What is Service Management?

If Six Sigma is used to measure 'how' the inputs and the outputs of a process can be optimized, then the next obvious question is: 'What are the processes necessary to deliver the service?'

Service Management is an alignment of strategy with objectives, processes, and procedures that drives delivery of services to the customer.

This alignment of strategy is critical in understanding 'what' processes are required for the delivery of a service.

The key components in Service Management are alignment, replication and linkage.

Alignment

The organizational strategy must include:

- a clear vision of where the company is going, which is communicated to every member of the organization in language that he or she understands
- clear definitions of key objectives that must be achieved to realize the vision
- translation of these key objectives throughout the entire organization so that each person knows how their roles and responsibilities achieve the vision.

To really get results, a strategic plan must be carefully deployed throughout the entire organization. Every strategic goal and objective must have clear priorities, established measurements, and the resources must be available to execute them.

When it comes to business-IT alignment, the business and IT should agree upon what business and strategy indicators give IT a hint how to align (for example, if the business wants to outsource parts of the production then this is a hint for IT to prepare for integrating suppliers in business processes and systems).

In Six Sigma terms, this is referenced from the customer's perspective as 'Critical to Satisfaction'. For example: If the organizational strategy is to be 'Best in Class', then from a customer's perspective, what does 'best in class' mean and from a Service Management perspective, what are the steps necessary to achieve 'best in class'? When combined, Service Management establishes the 'what' and Six Sigma establishes the 'how'.

Replication

The most powerful way to accelerate the results of quality and productivity improvement efforts dramatically is the ability to quickly replicate across the organization. An example from a leading international service company makes this clear.

The CEO was informed that the organization saved over \$350,000/year by resolving a chronic problem in one of the office locations. In another location, a different chronic problem had been reduced by 75%, which increased revenues by hundreds of thousands of dollars. It was not hard for the CEO to do the math. If each of the other 250 locations could replicate these results, the company would exceed its aggressive financial goals for the next year. But he also knew how hard it would be to get each autonomous location to agree to apply a similar problem-solving methodology.

When addressing replication, one of the first challenges to overcome is the resistance to change. The other challenges are the 'not invented here' syndrome, or the 'every location is different' excuse. Successful companies take action; they make replication an obligation, not an option. Creating an environment that is agile and flexible, where processes and procedures can be quickly and easily replicated will foster success in the business.

Jack Welch, CEO of General Electric, realized that the organizational culture fosters replication. Knowing that he had to instill a new value system within General Electric, he created a 'Work Out' program that consisted of the following four goals:

- build trust so that employees can speak freely and openly without negative consequences to their careers
- empower employees to influence change, drive improvements and make them responsible for their jobs
- eliminate unnecessary work so that employees can focus on 'value-add' tasks
- create an environment that is **'boundaryless'** so that the entire workforce is working toward common goals, and eliminate the 'not invented here' syndrome.

Linkage (process management)

A common theme carried throughout this chapter is to link processes from an 'end-to-end' perspective, and to measure performance in terms of inputs and outputs. Service Management also focuses on linking processes.

A 'process' is defined as a logically related series of activities that are conducted to meet a defined objective.

The single most important factor that must be considered in every process is the customer. A company is a collection of processes, and the customer only sees it in terms of the output of those processes. He does not care how it is organized, who reports to whom, what the various job titles are, or even where the different departments are located. All he wants is a product that meets his needs and requirements at the agreed time and for the agreed price. This often proves to be quite difficult for a lot of companies.

In order to meet these requirements, the organization cannot take a silo approach but must link all activities transparently, in such a way that the output meets the expectations. An 'end-to-end' view must be taken. Process mapping is a powerful tool used in Six Sigma to gain an understanding of the activities necessary to produce an outcome. The final outcome must always be from a customer's perspective. Process mapping can also identify key value-add activities from activities that provide little to no value and can be eliminated to produce a more efficient process (Figure 1.3).

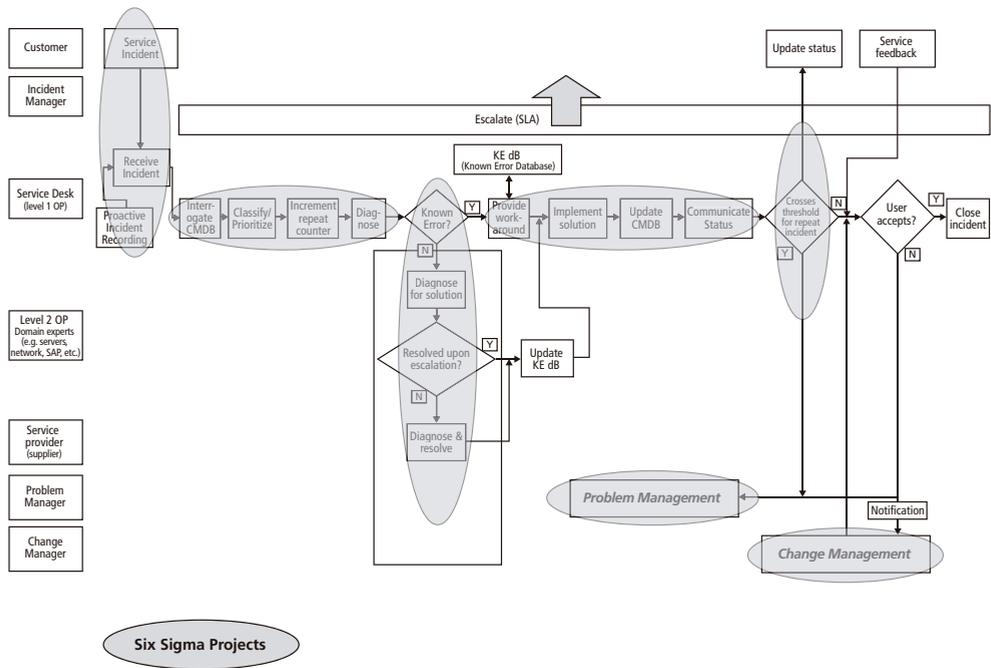


Figure 1.3 Incident Management process map

When you combine strategy, replication, and process management you have Service Management. When you combine Service Management with the power of Six Sigma, you have a well defined, controlled set of efficient processes to deliver a product that consistently meets or exceeds customer satisfaction.

The end results of a company focused on Service Management are:

- **delighted customers** - these are customers who keep coming back and buy over and over again. Loyal customers will frequently increase their purchases to the point of selecting sole suppliers for certain goods and services (Reichheld, 1996)
- **higher revenues** - by exceeding the levels of quality offered by competitors in the marketplace, organizations can add new customers, retain old customers, and move into new markets
- **lower costs** - higher quality can mean lowering costs by reducing errors, reducing rework, and reducing/eliminating non-value-added work. In the past fifteen years companies around the world have repeatedly demonstrated that higher quality frequently means lower costs. The costs associated with preventing errors during design are often far less than correcting the errors during production. Just think about the cost of product recalls due to defects or safety issues
- **empowered employees** - empowered employees are in self-control. They have the means to measure the quality of their own work processes, to interpret the measurements, and take action when the process is not on target.

1.2 IT Service Management and Six Sigma

We have learned the power of Six Sigma for measuring ‘how’ well we are performing and that Service Management is an alignment of strategy with goals, objectives, processes, and activities. Let us now see how Six Sigma and Service Management can benefit the **IT organization**.

Pressure has been put on IT organizations to become more aware of their role in supporting the business. To do this, the IT organization must adapt and implement a ‘Service Management’ approach to doing business.

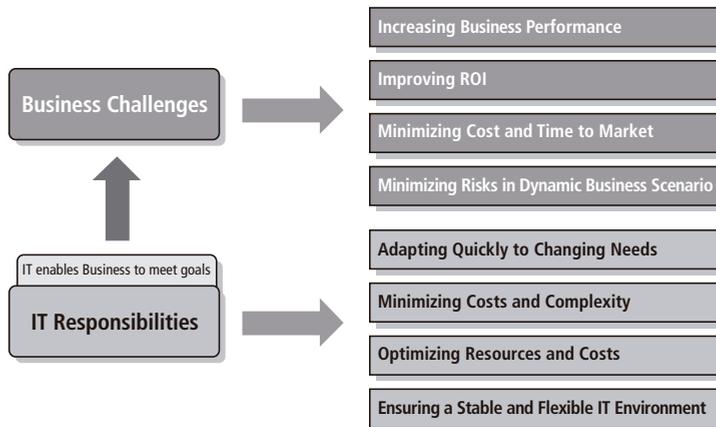


Figure 1.4 IT Service Management approach

IT Service Management is: the whole of principles and practices of designing, delivering, and maintaining IT services to an agreed level of quality, in support of a Customer activity.

The objectives of IT Service Management are alignment, customer focus, and quality. Six Sigma also focuses on customer and quality through the use of metrics.

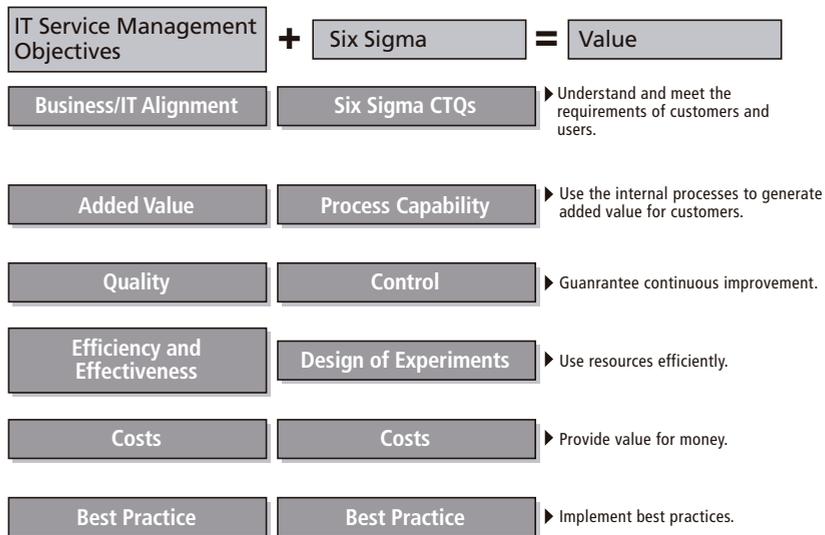


Figure 1.5 The sum of IT Service Management and Six Sigma

Six Sigma provides value to IT Service Management in the following ways.

- **Gauge process performance through measurements and applied statistics** - the process (for example break-fix service under a Service Level Agreement) can be monitored in a very sophisticated way. For this, Six Sigma uses a tool called a control chart. This chart effectively displays the 'heartbeat' of the process in time. It states on a periodical basis if your process is still in control and signals when you need to act.
- **Improve process efficiency in a very concrete and effective way, saving money** - the method to improve your business processes proposed by Six Sigma is unique compared to run-of-the-mill methods in that Six Sigma relies solely on solid data and numbers. There is room for intuition awaiting the start of an improvement project, but as soon as the project has started, the numbers, statistics and mathematics take over. The broad spectrum of analytical tools and techniques allows for problem-solving capabilities that are simply unsurpassed. The likelihood of a significant cause of the problem being found can be expressed in a number (p-value) and the combination of significant causes can be assessed on their combined predictive power for the behavior of the process (r-square number). This leaves no room for discussion and can be transformed to crystal-clear benefits in terms of financials and customer satisfaction.
- **Insure to serve your customers by defining and quantifying their needs** - the needs of the customer that the process serves are thoroughly mapped out and defined. This is called the external CTQ (Critical to Quality). It is the measurement of reference on the basis of which the customer is satisfied or dissatisfied. Usually, there is a bandwidth between which the process must perform to keep customers happy. By defining the customer needs (through customer needs mapping) in such a way that it can be expressed in numbers and can be measured

between the bandwidth, the process can be measured and assessed on its performance relative to the needs of the customer. This technique is called Process Capability Analysis (PCA). PCA allows you to calculate the amount the process needs to improve, and how to achieve that (change the mean, or reduce variation, or both).

- **Predict process behavior instead of reacting to it** - Six Sigma identifies the root causes for process behavior and thus allows for proactive controlling of these factors, enabling a much better control over the process. In even stronger terms: a mathematical equation will be issued which will predict at least eighty per cent of process behaviour. This allows the process to be steered upfront instead of correcting any mistakes later. This avoids mistakes and dissatisfied customers, saving time, money and reputations.
- **Distinguish between every day fluctuations and signals that need your attention** - Six Sigma gives us the root causes for process behavior in a mathematical equation; it also allows us to calculate the lower and upper limits that these root causes may take when affecting the process in order to stay within customer or company specifications on process output. Controlling these inputs on a control chart allows for very rapid signalling when action is required, thus avoiding and counteracting mistakes before they even occur.

1.3 Summary

*If you don't measure it, you can't control it.
If you don't control it, you can't improve it.
If you don't improve it, your company will not survive.*

TQM is not simply a means of conforming to specifications and requirements. It is a means of meeting and even exceeding the needs and expectations of customers. It also is an attitude that is ingrained within the culture of the organization that continuously evolves and matures. The three main features of organizations pursuing TQM are: focusing on customers, continuous improvement and the value of every member of the organization.

Management of processes will evolve TQM into Service Management. Aligning the organizational strategy to tangible objectives and consequently striving to reach these objectives is one of the key features of Service Management. The other two are replicating successes from other departments and linking processes to the organizational objectives. Through process management, TQM becomes Service Management.

Six Sigma can measure if the Service Management processes deliver the services they are supposed to deliver. Its integrated and coherent approach can give a clear view about the processes' capability of delivering. Unlike other quality tools, Six Sigma does not merely measure the outcome of Service Management; it measures the factors that drive Service Management performance - continuously improving and controlling these factors. Combining these two frameworks provides a powerful breakthrough for business and IT process management!