Leveraging the Six Sigma Methodology for Information Technology Deployments

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Let's clear the air…

I've heard the reasons you have not used Six Sigma in your Information Technology shop. Frankly, they are myths. Maybe you have heard them yourself: "Information Technology (IT) already has processes like ITIL and System Development Life Cycle (SDLC) – we do not need another." "Six Sigma takes too long to implement, is too complex, requires a degree in statistics, and costs too much." "Six Sigma is a manufacturing tool, and it doesn't apply well to IT – we're different".

While IT may, indeed, currently utilize several process methodologies, the rest of these misbeliefs are only the case where Six Sigma has been done wrong – "Sick Sigma". IT functions around the globe have now proven, beyond any doubt, that Six Sigma (done right) drives rapid performance impact on speed, cost, quality, and innovation without the need for loads time, money, or advanced statistics courses.

GE's Jack Welch describes it as, "One of the great management innovations of the past quarter-century and an extremely powerful way to boost a company's competitiveness…Nothing compares to the effectiveness of Six Sigma when it comes to improving a company's operational efficiency, raising its productivity, and lowering its costs." If you have seen organizations engage in "lean" manufacturing or "lean" enterprise efforts, you've already witnessed a subset of the Six Sigma methodology at work.

The City of Fort Wayne has become world-renowned for pioneering the Six Sigma methodology to redesign government. We have a well-published track record. Since 2001, the citizens have reaped the benefits of over $30 million in savings from such performance optimization projects. Many case studies from the city's Six Sigma journey have been captured by Mayor Graham Richard in his book, Performance is the Best Politics.

One key catalyst helping our government and other organizations open our eyes to the vast array of Six Sigma applications in non-manufacturing was Scott Lasater of the Lasater Institute for Systematic Innovation. Scott is a nationally recognized expert, known as the individual that trained Jack Welch when General Electric became seriously committed to the methodology. I would encourage anyone or any company truly interested in optimizing their performance, IT or otherwise, to contact the Lasater Institute to see what you've been missing.

A Six Sigma detective has access to an arsenal of tools and investigation techniques -- skills that are often missing from even the best, brightest and most experienced employees and technical experts. Six Sigma takes naturally good detectives and makes them GREAT detectives, which develops good employees into GREAT employees!

By analogy, consider one employee who sets a match to 74 pounds of potassium nitrate and 14 pounds of carbon. No interesting outcomes would be delivered. While he and others spend great time, effort, and resources working hard on these two factors, it is the Six Sigma detective who would be uniquely equipped for rapid discovery of an interaction with a third key ingredient that others missed. By adding just 12 pounds of sulfur, he converts this inert lump into in 100 pounds of gunpowder – now able to drive enormous impact and a variety of exciting breakthroughs.

Of course, there are plenty of well-meaning consultants, books and online courses that can leave the best of us dazed and confused, swimming in a sea of terms such as Value Stream Mapping (VSM), Failure Mode and Effects Analysis (FMEA), and Design of Experiments (DOE). However,

I can't emphasize enough the importance of connecting with the right experts, like Lasater, who can get the hay out of the barn loft and onto the barn floor where the rest of us can get at it. Once they have helped you learn to see all over again, you'll wonder why you waited so long.

Light at the end of the tunnel…attached to a train

According to the Standish Group's 2003 CHOAS research study of 13,522 Information Technology projects, 66% of all projects examined were shifted into the unforeseeable future or simply cancelled. Of the remaining 33%, only a fraction were truly successful -- often the result of "taskforces" created to ensure that, at the very least, the highest priority projects get delivered more or less on time. The rest were forced to deliver a result of some kind regardless -- achieved either by compromising the original specification (be that product features or quality) or by demanding overtime from project staff (and typically both). This was a major contributor to their estimate of a 43% average overrun cost. The lost dollar value for US projects in 2002 was estimated at $38 billion, with another $17 billion in cost overruns. This resulted in a total project waste of $55 billion against $255 billion in project spending.

Most IT professionals will profess the value of planning, but will confess their proneness to a "fire, aim, ready" project execution style. Our current methods leave many IT implementations doomed to under perform. Lasater refers to these as "Burn the toast and scrape it" methodologies.

DMAIC Demystified

By contrast, Six Sigma is the scientific method for investigating the root causes of both system/project underperformance and waste. It is systematic innovation and evidence-based management all rolled into one. The five phase detective-work cycle, known as "D.M.A.I.C", mirrors the same approach you'd find a physician using to investigate the physiological processes and systems of a sick patient:
(1) DEFINE = "Triage"
(2) MEASURE = "Symptoms Baseline / Vital Signs"
(3) ANALYZE = "Diagnosis"
(4) IMPROVE = "Custom Treatment"
(5) CONTROL = "Self-Sustained Remission"

DEFINE PHASE
The Define phase should be simple enough. As IT professionals we assist the business in defining projects all the time. In Six Sigma, the define phase is like project triage. It is more than defining the project, which we do pretty well. It is also prioritization. Sadly, in many shops prioritization is a function of which department screams the loudest, is the CEO's favorite unit, or has the most money.

Best-in-class IT operations have a strong project governance process -- the process by which projects are selected. Organizations need to develop the courage to question the enterprise ROI. A modified version of the "Five Whys" technique is another easy-to-implement Six Sigma tool to aid your shop in project selection. The projects selected should be aligned with the organization's mission. As an example, the governance body could ask the project manager questions like:

> Why do you think this project fits our mission?
> Why is this solution the best solution?
> Why is this solution the best fit for our organization?
> Why should this project move ahead of the others?
> Why you do believe this implementation will deliver the expected return on investment?

A healthy governance process must always choose which project is next, so another sign of a healthy DEFINE phase is a prioritized backlog list. The City of Fort Wayne allows all departments

to question the enterprise value of each project request. We are always clear which project should go next and which will have to wait.

One more Six Sigma technique for project selection is the identification the system's weakest link – the capacity-constrained resource (CCR). An organization will always be forced to move at the pace of the slowest process (a.k.a., limiting factor, bottleneck, or CCR). This is not just a manufacturing problem; it is a business process problem. An organization's energy will pay the greatest dividends when it is the enterprise's weakest-link process that receives the automation to reduce its cycle time or increase its capacity. Too often, we expend energy on non-constraint resources, with negligible benefit to enterprise-wide performance. In a word, we sub-optimize.

Failure to recognize this phenomenon is what so often causes a project manager to be completely dismayed at how badly her "critical path" calculations underestimated reality -- delayed because of all the projects simultaneously calling upon, and subsequently overloading, the CCR. Is it any wonder, then, that executives end-up battling – sometimes furiously – for resources? Or that yet another "taskforce" has been created to re-confirm the highest priority projects?

In stark contrast, Six Sigma demands, from the start, a focus on global optimization of the system as a whole, and prevention of potentially harmful side effects. Using these and other simple, easy-to-implement, low-cost methods, your IT shop will be on its way to better project selection and an improved define phase.

MEASURE PHASE
Measurements and baselines are extremely important. Successful IT implementations attain an accurate measurement of the current state to be compared with the future state in order to ensure the goals are achieved. Without a credible baseline it is difficult, if not impossible, to gauge what value a project has actually delivered. With a credible measurement, IT practitioners will be able to quantify which path to resolution provides the best results.

ANALYZE PHASE
The Analyze phase is equivalent to a physician diagnosing the roots causes of the system's undesirable symptoms. The IT practitioner analyzes which inputs or factors are likely contributors to the current outcomes and therefore if adjusted would provide the desired course correction. As in the gunpowder case, mentioned above, many breakthroughs are missed by ordinary investigators because they don't know how to reveal hidden interaction effects between multiple causal factors.

For example, were the upload/download problems (symptoms) caused by a particular operating system? …a particular browser? …the connection speed? …other applications being open? …time of day? …volume on the system? …the size of the transmitted file? …software version? None of these could be isolated to reproduce the problem. The breakthrough only came from a Six Sigma Black Belt who knew how to ***quickly*** uncover a multi-factor interaction (i.e., the symptom only occurred when a specific browser was simultaneously used with a certain application open, but only at certain connection speeds, and particular times of the day, which are correlated with higher volume of system demand)

IMPROVE PHASE
The Improve phase is where the physician develops and administers a customized treatment plan. Best-in-class IT shops will reflect on the measure phase to ensure the expected results are being achieved while watching for unintended side effects or breakage in other parts of the system. Remember, Six Sigma is always about global optimization of the system as a whole.

CONTROL PHASE
IT practitioners have historically taken shortcuts during the Control phase. This phase is intended to ensure the achieved results are being maintained. Unfortunately, most shops only check once, immediately after an implementation. They prefer the RONCO approach -- "Set it and forget it". Best-in-class operations use periodic reviews, automated sensors, autonomous adjustment systems, or mistake-proofing mechanisms to ensure the long-term self-sustainability of performance.

IT BEST PRACTICES

Define. Create or strengthen your governance process. All requests are not equal. Select the projects that have the largest effect on process improvement. Remember that an improvement in speed or capacity at a non-constraint is nothing but a mirage, with no benefits for the enterprise as a whole waiting at the end of the rainbow. Develop the organizational courage to ask tough questions about alignment and the strength to do the right thing in the face of pressure from suboptimization advocates.

Measure. Value the data collection process as the foundation for future improvements. Ask your subject matter experts for clues to the correct starting points. Measure correctly and measure repeatedly to ensure the accuracy of the baseline.

Analyze. Understand the correlation between cause and effect. Use data mining and rapid, intelligent experimentation with alternatives to achieve the optimal results. Utilize IT tools like proof of concept and rapid application development to quickly identify the appropriate course of action.

Improve. Speed the implementation cycle by correctly resourcing the development team. Provide them with the necessary capital, access to other knowledge workers, and time to successfully complete the effort. Continually reflect on your baseline measurement to ensure trending in the right direction. Diligently review results, scanning for any unintended or unwanted side effects and adjust appropriately.

Control. Continue your measurement cycle beyond implementation. Dashboards are an effective way to identify a process gone wild. Ask for feedback. Get in the habit of reviewing lessons learned. Use the lessons as a starting point for future implementations.

TIPS FOR SUCCESSFUL DEPLOYMENT

Six Sigma is about culture change in an organization. As with any culture change, it requires a champion with the influence and authority, given or assumed, to effectively lead change. While it takes time for an organization to change course, the IT change agent can turbo-charge the effort by initially focusing on highly visible, non-trivial, quick wins – especially at the capacity-constrained resource. With the right strategic projects, one can harvest enormous low-hanging fruit, demonstrate success, gain public relations value, and build organizational momentum.

Once IT earns a reputation for high-performance processes and high-reliability delivery systems, the rest of the organization can begin focusing less on containing the costs of IT (like so much plumbing or telephone service). They will then be freed-up to concentrate more on tapping IT's potential for delivering new, innovative ways to interact with its customers and suppliers, as well as other competitive business and service opportunities.

Leading this sort of change requires one to develop a clear, compelling vision and then effectively communicate that vision to the rest of the organization. One of the best ways to accomplish this is to invest a couple of weeks with an expert like Scott Lasater, who has coached over 3000 executives who, in turn, delivered more than $500 million to some of the world's leading enterprises. Then, visit us at the City of Fort Wayne to see firsthand how science has revolutionized government.