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Implementing Six Sigma: Exploring Issues in Suboptimization

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"So, I have an amazing mousetrap, and I explain to you, I communicate to you what's better about my mousetrap. ... (But) ... my mousetrap's no longer unique. It's now become one of 14 different ways to kill mice. So, the customer isn't interested in hearing about how my mousetrap's different, all the customer wants to know is 'can I give them dead mice cheap?'"

Neil Rackham•

"A new scientific truth does not triumph by convincing its opponents and making them see the light, but rather because its opponents eventually die, and a new generation grows up that is familiar with it."

Max Planck**

"We have met the enemy and he is us."

Walt Kelly•••

The Problem

In March 2006, Secretary of the Army Francis J. Harvey announced the continued deployment of the Lean Six Sigma process within the Army. Lean Six Sigma (LSS) is the combination of two improvement tools: Lean and Six Sigma. Lean – whose focus is a disciplined, process-focused production system – was substantially developed by Toyota Motor Company in its Toyota Production System to compete in the post-World War II auto market dominated by American manufacturers. Six Sigma (6σ) – a quality process developed by Motorola Inc. to decrease manufacturing defects to a statistical level of six standard deviations (3.4 defects per million or 0.00034 percent) – has been in existence for two decades.

Despite the many myths surrounding who should be given credit for their creation, it is clear – as in most instances of human endeavor – that both Lean and 6σ were the child of many minds within Motorola[1] and Toyota.[2]

Neither Lean nor 6σ appeared from nothingness. It owes a great debt to a well-established quality practices movement that emerged as a science in the United States during the 1920s. The quality practices movement marked the application of descriptive and inferential statistical techniques – already well established in mathematics and other fields – to manufacturing and the manufacturing process.

In particular, the emergence of 6σ and statistical process control (SPC) tools have not, however, resulted in an overabundance of well-documented, rigorous case studies in the general quality practices professional literature. Those case studies that are available all too often serve the functional purpose of a consultative brochure, rather than a critical report of a specific quality improvement effort's successes and failures. Triumphs are trumpeted and disappointments are rarely ever mentioned. This is particularly ironic when you consider that the notion of hypothesis testing and measurement are not altogether unfamiliar issues to its practitioners.

In spite of the considerable body of knowledge and experience within the general quality movement and despite its current "flavor-of-the-month" status and its considerable success in the manufacturing arena, 6σ largely has languished as a perceived viable tool in the realm of nonmanufacturing processes. There exists an acute lack of balanced reporting of 6σ efforts although there is abundant anecdotal evidence that 6σ implementation has not always been successful. Some argue[3] that performance expectations for Six Sigma have been unrealistically high. This is not an explanation; at best, it is

•Interview conducted by Josh Krist (9/18/2000): SalesLobby.com. Retrieved June 6, 2006 from: http://www.ittoolbox.com/peer/rackham22.htm.
**Scientific Autobiography and Other Papers, trans. Frank Gaynor, pp. 33–34 (1950). •••Earth Day, 1970

only a description of the symptom, and it begs the question of what caused performance expectations to get unrealistic in the first place.

Nowhere has any practitioner or institution attempted to statistically survey the universe of 6σ to discover what proportions are successful and what proportions are unsuccessful and for that matter – why or why not.

Related literature on why software re-engineering projects fail, why projects fail, why Total Quality Management failed, etc. is mostly anecdotal and consensus-based. John Bergey et al[4] have pointed out that software re-engineering project failure can be traced back to management rather than to technical shortcomings. They have enumerated 10 risk factors:

- The organization inadvertently adopts a flawed or incomplete re-engineering strategy
- The organization makes inappropriate use of outside consultants and outside contractors
- The work force is tied to old technologies with inadequate training programs
- The organization does not have its legacy system under control
- There is too little elicitation and validation of requirements
- Software architecture is not a primary re-engineering consideration
- There is no notion of a separate and distinct re-engineering process
- There is inadequate planning or inadequate resolve to follow the plans
- Management lacks long-term commitment
- Management predetermines technical decisions

Additionally, Karl Weigers[5] has listed 10 traps to avoid in software metrics that are thought provoking and pertinent to 6σ implementations:

- Lack of management commitment
- Measuring too much, too soon
- Measuring too little, too late
- Measuring the wrong things
- Imprecise metrics definitions
- Using metrics data to evaluate individuals
- Using metrics to motivate, rather than to understand
- Collecting data that is not used
- Lack of communication and training
- Misinterpreting metrics data

These assertions fit nicely with one another, with some overlap, and they seem to jibe with Michael V. Petrovich's observation that businesses must "address fundamental system issues to sustain or even achieve improvement objectives."[6] Petrovich goes on to describe his model of improvement hierarchy, an incrementally stepped maturation process, leading to a series of cultural and process paradigm shifts that transform the organization over time. It is this transformation that allows process improvement to take place.

Ouellette and Petrovich[7] have noted that alienation of the process owners is a chief danger of implementing 6σ:

"Many front-line and area managers have displayed frustration when unasked-for help is given to solve a problem in their area. Strangers from 'Quality' or a black belt swoop down from on high, put together a team, find a solution (for which they get the primary reward and recognition) and swoop away to work on another project regardless of the long-term viability of the solution. Justly or unjustly, local process owners (like critics of non-representational art) think to themselves, 'Well, sure, I could have done that if I had that amount of time away from my real job!' Or worse, the solution in fact is impossible to implement over the long term due to an incompatibility with the real process or the lack of process auditing and monitoring to maintain interest and control."

Despite the obvious and substantial strengths of 6σ as a tool, as well as the considerable marketing hoopla that surrounds it, there is a strong impression from anecdotal evidence that 6σ projects don't seem to have any better chance of success than any other "project."

On one hand, Six Sigma requires a sustained high-level commitment and a total transformation of the inner-culture of the organization, from top to bottom. On the other hand, Six Sigma – as with all things – must be budgeted incrementally, and must continually compete for budgetary dollars with other endeavors. There is considerable tension between these two realities; the resolution of which is critical to the success or failure of each and every 6σ implementation effort.

All of the literature available – as well as my own professional experience – strongly suggests that corporate and business managers are ill-equipped to champion change in organizations that are ill-equipped to implement change within it.

The Assumption Base

The 2004 Standish Group's "Chaos Report,"[8] a biannual study based (to date) on surveys of more than 50,000 information technology (IT) projects, estimates that only 29 percent of all software projects

succeed. Fifty-three percent of all projects fail to attain their specified cost, schedule, or performance goals. An additional 18 percent are cancelled before completion or delivery and are never used. This results in a 71 percent failure rate.

This paper assumes a similar failure rate for 6σ projects. There are several reasons for this assumption:

• In the absence of any other evidence, there is nothing to suggest that a 6σ project is any more complex or difficult than an IT project

• 6σ projects frequently have a substantive IT component

• Both 6σ projects and IT projects exist within the same environmental and managerial milieu; if project failure is substantially a management failure issue, then the root causes of one should be substantially the same for the other

At the present time, 6σ is being marketed and largely implemented as an enterprise-wide undertaking, yet functionally and by budget treated as a project. The Project Management Institute defines a project – very specifically – as being "a temporary endeavor undertaken to create a unique product or service."[9]

A senior 6σ program manager recently asserted to me that a 6σ project should be initially scheduled for duration of no more than three to four months, and should – at the outside – "succeed" within a six-month period. If not successful within that time frame, the 6σ project would undoubtedly fail to be renewed in the next budget cycle. The smart business choice is to cut your losses, and move on.

Booz Allen Hamilton's (BAH) 2005 chief executive turnover study – done annually – states: "Necessary transformations of companies typically require three or four years."[10] The same report cites the average tenure of a company CEO is around 7.9 years. The BAH study further reported 35 percent of departing North American CEOs are forced out of office. A 2004 study conducted by Spencer Stuart[11] found the median for the top Standard & Poor's (S&P) 100 CEOs has not changed for the past three years, holding steady at four years. Four years is also the median tenure as CEO for the S&P 500 group as a whole.

If a company needs three to four years to transform themselves, and CEOs tenure is somewhere between 4–7.9 years, and if 66 percent of all 6σ projects fail, the outlook for Six Sigma does not look bright unless some changes are contemplated in how it is implemented.

If we look at the military, where the typical length for duty station assignments are significantly less in duration, some obvious transformation issues come to the fore.

Suboptimization

The principle of suboptimization asserts that optimizing each subsystem independently will not in general lead to a system optimum, or more strongly put: improvement of a particular subsystem may actually worsen the overall system.[12] In other words, the whole is less than the sum of its parts.

A company that goes out and merges with its competitor may not be successful as the newly amalgamated business. A government organization that takes over the administration of smaller independent agencies may not work more efficiently. Laying off workers and thereby decreasing overall budget reductions in annual payroll, may result in a net loss to the organization of vital institutional memory and specific functional process acumen.

A NASA report once noted: "It is often a tendency of engineers to move too rapidly to the level of greatest detail. To get down to the real design work as rapidly as possible, the design criteria are often set in an artificial or arbitrary manner. This is exemplified by the idea, 'Let's design one that will do everything model X will do; only let's have it cheaper and more reliable.'

"Worthwhile advances are certainly made using this approach; however, minimizing the negative value is only part of the task of maximizing the net value of a system. Intense consideration of only a few of the design factors while neglecting others is called suboptimization; it leads to incomplete, therefore unsatisfactory, solutions. To avoid suboptimization, it is necessary to develop the design criteria logically from the overall system requirements, always keeping the maximum-value goal in mind."[13]

At the heart of the suboptimization issue, therefore, are four paradigm blind spots:

• Ignoring the cumulative entropy created by the interaction of the various subsystems with one another

• Confusing the maximization of the output of the various subsystems as being synonymous with maximizing the final output of the overall system

• Assuming that the final outputs will achieve the targeted goals and/or outcomes

• Failing to validate that the targeted goals are actually moving toward the overall organizational vision

As it relates to Six Sigma, enterprise-wide implementation of 6σ may cause unintended suboptimization outcomes. An enterprise-wide commitment to 6σ implementation may trigger an increase in internal competition for scarcer operating resources. It may produce an unexpected increase in decision-making dependencies that bottleneck organizational decision-making. It may act as a catalyst for unexpected personal, business unit and cultural conflict.

Not all processes are appropriate targets for 6σ. Eliminating waste and decreasing variation may not result in decreasing costs or increasing efficiency. Theory of constraints tells us that a system is only as fast as its slowest subsystem.

Large Organizations: Organizational Interest vs. Self-Interest

In 1953, President Dwight Eisenhower named Charles Erwin Wilson, then president of General Motors, as secretary of Defense. During the confirmation hearing before the Senate Armed Services Committee, Wilson was asked if, as secretary of Defense, he could make a decision adverse to the interests of General Motors. Wilson answered in the affirmative, but added that he could not conceive of such a situation, "because for years I thought what was good for the country was good for General Motors and vice versa."[14]

It is neither new nor surprising that people associate their extended groups' welfare with their sub-groups' welfare, or that they associate their sub-groups' welfare with their own welfare. To be self-interested is to be human. In the realm of sales, Neil Rackman[15] has pointed out that the customer becomes more cautious committing to a sale as the risk of failure increases. The higher the risk – whether it is in terms of cost, or career, or public failure, or a plethora of other possible rationales, reasons and variables – the more cautious are the decision makers.

And as a sale, Six Sigma is high-end in every respect. Literally, the future of the organization, its key decision-makers, its mission-critical departments and business units, and the careers of many individuals – high and low – will be affected.

What Rackman does not address – because for him the commitment to the sale is the end of the process – is the multitude of "post-sales" sales that must occur to get implementation of any project as large and potentially complex as one that implements 6σ. Dozens of individuals, many who may not have been brought into the original decision to implement, now have to commit to doing the hard work of getting the job done. Some of these individuals may have very different ideas of what the project means for the organization, their sub-group, their business unit, or their own self-interest. Not all will be initially willing to go through the agony of change in pursuit of goals and outcomes they neither understand nor trust, for a management team or organization for which they may feel no loyalty.

Kark Weigers[16] has listed 10 software development traps:

- The project's vision and scope are never clearly defined
- Customers are too busy to spend time working with developers on requirements
- Customer surrogates (managers or marketing) claim to speak for the users, but they really don't
- Users claim all requirements are critical and do not prioritize them
- Developers encounter ambiguities and missing information during coding, and they have to guess
- Customers sign off on the requirements, then change them continuously
- The scope increases as requirements changes are accepted, but the schedule slips because more resources are not provided
- Requested requirements changes get lost and the status of a change request is not known
- Functionality is requested and built, but never used
- The specification is satisfied, but the customer is not

All one needs to do is substitute "consultant" for the word "developer," and substitute "process improvement" for the word "coding," and it all sounds eerily familiar.

In a recent interview, Ralph Szygenda, group vice president and chief information officer, related an obvious, but often overlooked change requirement:

"You have to determine whether a company is ready for change. I had been in corporate America in IT positions at various companies for 26 years, so I knew the issues with making change. I knew certain ground rules had to be agreed upon. … If you are going to be a change agent, you have to determine 'can it be done in the present environment?' If a company is not ready for change, then you have big problems not only in information technology, but with everything else."[17]

The simple truth: Projects succeed or fail because of people, not tech-

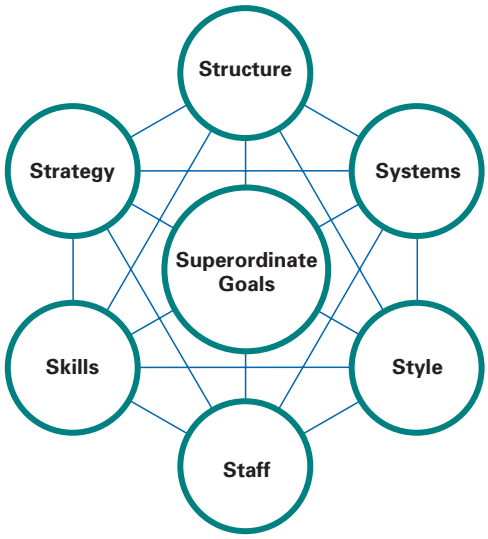
nology, tools, or processes. People will always be the key.

Superordinate Goals

In the early 1950s, Muzafer Sherif coined the phrase "superordinate goal" to describe a mutually held objective that is "compelling and highly appealing to members of two or more groups in conflict but which cannot be attained by the resources and energies of the groups separately. In effect they are goals attained only when groups pull together."[18]

In a series of controlled experiments under the guise of a boy's summer camp, Sherif and his colleagues fostered intergroup rivalry and hostility through intense competition. These rival groups were then brought together to face a common challenge; e.g., repairing the camp's water supply, pulling a stalled truck about to fetch food, etc. Superordinate goals succeeded where previous attempts at conciliation, goodwill and negotiation between the leaders had failed. The outcomes of these experiments were subsequently reported as the "Robbers Cave Experiment."[19]

In the late 1970's, McKinsey & Company used Sherif's idea of superordinate goals as the centerpiece for a model of organizational change: the 7 S Model. The authors of this model were interested in exploring how organizations might change in the years ahead after a decade of decentralization. The main authors of the model were Richard Pascale and Anthony Athos from Harvard and Tom Peters and Robert Waterman from McKinsey. Peters and Waterman later would incorporate the model into their book "In Search of Excellence," which became a best seller in the 1980s.[20] In addition to superordinate goals, the authors identified the elements of structure, strategy, systems, style, skills and staff, as presented below:



The 7 S Model

The central theme of the 7 S Model is that these seven key elements within the organization are interactive and not independent from one another. Each element receives inputs and provides outputs from all the other elements in a network of dependencies. Each needs elements of the others to be successful.

The 7 S Model has gone on to become the focal point of McKinsey & Company's consultative approach. Over the years the McKinsey has had notable successes (Hewlett Packard, Johnson and Johnson, General Motors and Siemens), and some notable failures (Enron, Swiss-Air, Kmart, Global Crossing).

Obviously, a model – by itself – is just not enough.

Steering the Customer to Steer Six Sigma: P-DMAIC

It has already been suggested that, despite increased interest in Six Sigma and SPC, that there is a general lack of the organizational, managerial and worker maturity necessary to initiate and sustain 6σ. The great majority of organizations are just not ready for 6σ implementation.

In this, the Six Sigma professional community must accept its fair share of the responsibility.

Six Sigma is not only a set of techniques and analytical tools; it is a business, too. As the ranks of Six Sigma professionals grow, there is ever increasing competition and greater pressure to "close" potential business. Perhaps the most difficult thing for any business to do is to say no to a potential customer. But – if we are to best serve our customers, and thereby best serve ourselves – that is exactly what seems to be necessary. As the experts in the arena of process improvement – it is we who are ultimately responsible for the high 6σ failure rate. If these failure rates are to be improved, it is to ourselves that we must look. We must change if we ever hope for our customers to do the same.

Essentially – when all is said and done – Six Sigma, as well all other process improvement methodologies, requires behavior modification on a fairly grand and complex scale. Instead of DMAIC (define, measure, analyze, improve and control), we should be talking about the absolute necessity of preparing for DMAIC (P-DMAIC).

Individually and as a group, business and government entities must decide to end their individual "addiction" to dysfunctional organizational behavior. A lesson can be gleaned from the world of medical psychology.

Despite the fact that addiction continues to be a significant problem throughout the world, it is only within the past decade or so that studies have attempted to determine how individuals are able to make the changes necessary to overcome it. Prochaska, DiClemente and Norcross[21] developed a paradigm based on empirical data to approach this problem: the Transtheoretical Model (TTM) of behavior change. The study concluded that individuals are able to achieve lasting behavior change, with or without professional help, so long as specific structures underlying the behavior change existed. This model has been validated in a wide range of health behaviors, including smoking, drinking, eating disorders, and illicit drug use.

The stages of TTM and its processes are as follows, and presented in the table, below.

1. Precontemplation: Individual has the problem (whether he or she recognizes it or not) and has no intention of changing

• Consciousness raising (information and knowledge)

• Dramatic relief (role playing)

• Environmental re-evaluation (how problem affects physical environment)

2. Contemplation: Individual recognizes the problem and is seriously thinking about changing

• Self-re-evaluation (assessing one's feelings regarding behavior)

3. Preparation for Action: Individual recognizes the problem and intends to change the behavior within the next month

• Self-liberation (commitment or belief in ability to change)

4. Action: Individual has enacted consistent behavior change for less than six months

• Reinforcement management (overt and covert rewards)

• Helping relationships (social support, self-help groups)

• Counterconditioning (alternatives for behavior)

• Stimulus control (avoid high-risk cues)

5. Maintenance: Individual maintains new behavior for six months or more

It should be noted, however, that these phases do not tack a simple linear progression; relapse is both common and expected. Each stage is seen as dynamically interacting with the others. Individual may regress to previous stages, but they tend to not completely fall back to where they started. Each individual advances through each stage, making progress and losing ground. Each person learns from mistakes made over time, and uses those insights to move toward their sought after goal.

Concept	Definition	Application
Pre-contemplation	Unaware of the problem, hasn't thought about change	Increase awareness of need for change, personalize information on risks and benefits
Contemplation	Thinking about change, in the near future	Motivate, encourage to make specific plans
Decision/Determination	Making a plan to change plans, setting gradual goals	Assist in developing concrete action
Action	Implementation of specific action plans	Assist with feedback, problem solving, social support, reinforcement
Maintenance	Continuation of desirable actions, or repeating periodic recommended step(s)	Assist in coping, reminders, finding alternatives, avoiding slips and relapses

More recently, Prochaska has attempted to apply TTM to organizational change.[22]

This medical analogy to addiction is not outlandish. As consultants, we need to stop selling panaceas that in the parlance of psychiatry "enable" the continuation of dysfunctional behavior. We need to start talking openly and forcefully, as any professional whose role is to be concerned for the "health" of his or her "patient," about the conditions necessary for success of Six Sigma and process improvement efforts. We need to be talking about it amongst ourselves and, more important, we need to be talking about it at the presales stage. We need to talk to prospective customers about how hard process change is, and what the organization needs to do to begin preparing for it. We need to begin establishing minimal criteria for Six Sigma implementation efforts. And it is here – in more detail – where Petrovich's Improvement Hierarchy shines, shedding some much-needed light:

To modify behavior, at least one person in an organization needs to decide that change is necessary, and make a commitment to make that change become a reality. All too often businesses do not have an organizational purpose beyond making a profit, and those who have a more expanded vision tend to look outward, not inward. What kind of company do you want your organization to be? What sort of people do you want working there? What are the sort of leadership qualities and work ethic attitudes do you want to encourage? What sort do you want to discourage? And – most importantly – what are you willing to do to take personal responsibility to assure all of this takes place?

What is being done to engender management-employee trust and respect? Have housekeeping standards been implemented? Has a minimal standard for equipment maintenance been initiated and maintained? What efforts are being made to define and standardize the organization's processes, and to develop common operational practices? What metrics and controls are currently in place, and to what extent has its scope been established throughout the organization?

If the person asking these questions is not the CEO or the chairman of the board, then the company in question has a very large problem, indeed.

The Improvement Hierarchy

Presuming that there is one well-motivated individual in the organization who is willing to take on the challenge and to shoulder the necessary sustained effort to bring about change, will that individual have the skill and the good fortune to be able to persuade and mentor others to support the effort?

There is a lot to be said for placing everyone in the same lifeboat. It certainly worked for Muzafer Sherif. It certainly tends to work in the military where loyalty to one's unit – loyalty to the individuals who are literally guarding your back – assures teamwork and self-sacrifice. But do superordinate goals need to be draconian to succeed? Are there kinder and gentler implementation methods floating around?

A few initial modest suggestions come to mind:

Perhaps the most obvious idea – one that is by no means new, yet seldom used – is asking front line employees to participate actively in making their own piece of the universe better. What could be done to make your job more efficient? What can be done to make our service better for the customers you deal with? The Christian Science Monitor reported recently how American Airlines turned to its employees rather than high-priced outside consultants in its cost-saving efforts.[23]

Another idea that has been floating around for some time, and inherent in the suppliers-inputs-process-outputs-customer (SIPOC) process used in 6σ, is to actively broaden the definition of "customer" to include internal customers, particularly as it relates to business units

providing internal support services: e.g., information technology, human resources, maintenance.[24] Within this context, the use of internal levels of service agreements to establish customer-centric service metrics, as well as initiating levels of internal reimbursement, should also be considered.

Team-based performance is a promising approach to organizational maturity. One technique that shows great potential is the growing use of team-based performance standards in lieu of individual reward systems. Jack Zigon has suggested the use of a systematic method starting with the team's accomplishments and defining weights, measures and performance standards for both the team and its individual members.[25]

However, the concept of team-based performance must be expanded to include managers and executives. Executive and managerial performance needs to be linked to the performance of the teams they manage, as well. This puts everyone in the same lifeboat; outcomes affect not only the immediate team members, but the extended chain of responsibility as well. Everyone's report card is impacted equally.

Instituting the use of continuing professional development as a standard in the workplace should also be considered. In other words, having the explicit expectation that membership in the organization – in addition to minimal performance standards – also includes standards for continuing professional development as a formal criterion for both job retention, and advancement and promotion.

Initiating each of these changes will, of course, not be without a great deal of effort. The point is that these and other cultural change mechanisms must be on the Six Sigma practitioner's checklist when considering whether an organization is a good prospect for process improvement.

Borrowing methodologies from the discipline of Extreme Programming (XP) would also appear to be useful. Originally conceived by Kent Beck,[26] XP is designed to be used with small teams of developers who need to develop software quickly in an environment of rapidly changing requirements. XP teams design software for specific functions; no software functionality is added that is not specifically requested. Nothing that does not directly add to the specific outcome requirements of the customer is considered.

Extreme Programming is based on 12 principles:

• The Planning Process – The desired features of the software, which are communicated by the customer, are combined with cost estimates provided by the programmers to determine what the most important factors of the software are. This stage is sometimes called the Planning Game.

• Small Releases –– The software is developed in small stages that are updated frequently, typically every two weeks.

• Metaphor –– All members on an XP team use common names and descriptions to guide development and communicate common ideas and terms.

• Simple Design – The software should include only the code that is necessary to achieve the desired results communicated by the customer at each stage in the process. The emphasis is not on building for future versions of the product.

• Testing – Testing is done consistently throughout the process. Programmers design the tests first and then write the software to fulfill the requirements of the test. The customer also provides acceptance tests at each stage to ensure the desired results are achieved.

• Refactoring – XP programmers improve the design of the software through every stage of development instead of waiting until the end of the development and going back to correct flaws.

• Pair Programming – All code is written by a pair of programmers working at the same machine.

• Collective Ownership – Every line of code belongs to every programmer working on the project, so there are no issues of proprietary authorship to slow the project down. Code is changed when it needs to be changed without delay.

• Continuous Integration – The XP team integrates and builds the software system multiple times per day to keep all the programmers at the same stage of the development process at once.

• 40-Hour Week – The XP team does not work excessive overtime to ensure that the team remains well rested, alert and effective.

• On-Site Customer – The XP project is directed by the customer who is available all the time to answer questions, set priorities and determine requirements of the project.

• Coding Standard – The programmers all write code in the same way. This allows them to work in pairs and to share ownership of the code.

XP is essentially an approach to problem solving, where the customer sets the priorities but the implementers estimate the level of effort required. Bare-bones functionality is the central emphasis, rather than elaborate requirements that may never be implemented.

Doug DeCarlo has suggested that one of the keys to a more agile

approach to project management is to manage by deliverables, rather than activities.[27] He suggests seven keys to success when managing by deliverables:

• The project team breaks the project down into a network of deliverables. Use large post-it notes.

• Each deliverable is assigned both a producer and a customer. The customer is the person internal or external to the project team who must be satisfied with the deliverable.

• The producer and customer negotiate the conditions of satisfaction: Timing, deliverable content (scope), cost and quality.

• Both parties share a common understanding of the potential risks to meeting the conditions of satisfaction.

• The producer maintains his own task list outside of the master project plan. This cuts down enormously on otherwise useless administrative overhead.

• Producer and consumer agree on checkpoints and an early warning system if a commitment can't be met.

• There is no penalty for not meeting the original agreement. However, it is unacceptable not to give an early warning of an expected slippage or problem.

Keeping in the tradition of a more agile response, in a separate article, DeCarlo further suggested the use of the abbreviated, less complex mission (vision) statement and requirement gathering tools, using the Katrina disaster as his example. [28]

Agile Six Sigma?

Six Sigma's roots stem from the application of mathematical principles and tools to quality issues of assembly-line manufacturing, where millions of similar items were being produced. Decreasing defects in this kind of environment is essential. It reduces waste and re-work, and thus increases profitability. But in this instance, process and quality improvement are only feasible because these manufacturing and fabrication processes exist within a relatively stable environment. In a manufacturing environment, for example, where the master pattern for a particular item was changed every month, projects of all kinds, including Six Sigma, would have a much more difficult time achieving product quality.[29]

It has been noted by others that applying quality criteria to non-manufacturing processes changes the definition of quality.[30] More important, there is a change from a stable environment to one that may be much more dynamic, where the only constant may be change itself. Citing DeCarlo, again:

The main difference between a traditional project and an extreme project has to do with the level of predictability surrounding the undertaking. Extreme projects live in turbulent environments: high speed, high change and high uncertainty. In other words, requirements are constantly changing throughout the project in response to environmental factors that include competition, technology, shifts in customer needs, regulatory requirements and/or economic conditions.

For an extreme project, since change is constant (and stability is the exception), yesterday's plan is about as current as last month's newspaper. This suggests that we apply a different approach to planning and managing the project, one that is lithe, adaptable, or as some pundits like to say, "agile."[31]

But is the choice really between the two competing alternatives: an enterprise-wide approach that is primarily activity oriented, or a more incremental approach that is more deliverable oriented? Is there another path – a hybrid – that balances the risks of each with the strengths of both?

Jeff Chilton has suggested that the real issue is between stability and innovation[32] through timing. He suggests a stair-stepped approach to process improvement that alternates between stability and innovation. By alternating between periods of stability and periods of innovation, your organization creates a timed rest period to recover and stabilize.

Chaos may exist on the outside, but the environment within the organization is allowed enough stability to prevent disarray.

In many respects, Six Sigma is custom made for an agile approach.

Enterprise-wide approaches, as already discussed, tend to run out of gas for any number of management and cultural reasons. They tend to be well documented, or many times over-documented, because so much is riding on the outcome of a single mega-project. A great deal of time and energy is spent meeting subject matter experts, functional managers, stakeholders, not to mention the customer. Reports must be written, project artifacts must be drafted, validated, reworked and validated again, and contracted items must be tracked and delivered.

Alistair Cockburn has made the distinction between high-disciplined, medium-disciplined, and low-disciplined methodologies.[33] The distinction strikes me as being fallacious, in the same way as the distinction made between dangerous and safe weapons. The Waterfall and Spiral Methodologies developed by Barry Boehm, Grady

Booch's Methodology and Object Modeling Technique, Rational Objectory Methodology, WinWin Spiral Methodology, Project Management Institute, Capability Maturity Model Integration , International Organization for Standardization, Total Quality Management, Extreme Programming and all the other efforts to make programming and projects more efficient all require discipline. There are no disciplined and undisciplined methodologies, only disciplined and undisciplined people.

Despite years of experience that indicate that a "waterfall" approach to projects has serious flaws, and that a more interactive approach substantially decreases risk, most projects still use a waterfall approach. Why? Because change is hard, and it takes discipline and commitment, sweat and many tears, to have any possibility of success. Like the Aristotelian view of the universe that held sway for almost two millennia, it is difficult for people to change from one view of the universe to another – regardless of the substantial body of evidence that undercuts its assertions. It is even more difficult in a world in which change takes place at an ever-increasing rate.

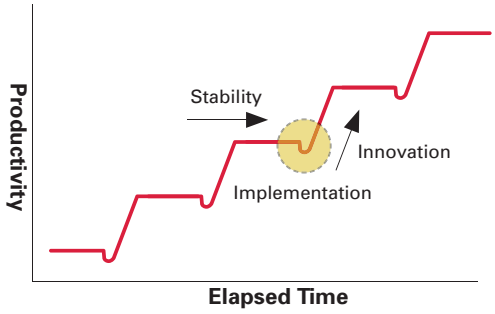
Difficult or not, we live in a world where those who adapt best survive. It is just that simple.

Conclusion

Lean and Six Sigma are among the latest management tools designed to increase efficiency and quality, and to decrease waste. The evidence suggests that Six Sigma's overall success rate is no better than any other project, and it has been asserted that the problem lies not with any specific methodology, but rather in the people who implement it.

In order to implement change, people and the institutions they populate must be ready for change. Consultants must make certain that the prerequisites for successful change are present before attempting to implement Six Sigma or any other process improvement effort.

We have failed to assist our customers to prepare for the changes they want and need. Realistic preparation for change – and the necessary time to initiate that preparation – is the key.



Alternating Periods of Stability and Innovation

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