

# Lean Six Sigma and High-Performance Organizations Combined

*Some are born great, some achieve greatness, and some have greatness thrust upon 'em.*

Shakespeare, *Twelfth Night*

**T**HE COMBINED DISCIPLINES of Lean Six Sigma and High-Performance Organizations have not yet been widely implemented. This is why many independently implemented Lean Manufacturing, Six Sigma, and HPO efforts have faltered. Early successful adopters of aggressive process improvement programs, such as Motorola, StorageTek, and AlliedSignal on many sites naturally combined these LSS/HPO elements of simple process improvement principles, advanced process improvement using statistical methods, and the use of teams to generate high levels of energy and commitment.<sup>1</sup> Experience has shown that LSS/HPO is best implemented at the level of a plant, a site, or other relatively self-contained organizational unit. This strategy, as contrasted to a “big bang” approach that attempts to mandate standard

approaches simultaneously across multiple global locations, provides for an easier to manage transition and the resulting operation and local motivation to continuously improve.

This chapter presents essentials that leaders must know about HPOs for the following topics: representative results, the value proposition, typical outcomes, brief historical notes, key concepts, ten important “pay attention to” elements, key players, hallmarks of the discipline, and specifically what it is not.

## Representative Results



Representative successes of LSS/HPO implementations include:

- In 1988 StorageTek’s HDA production line organized into HPTs and used advanced statistical tools to dramatically improve quality and costs. Within two and one-half years, the product went from a mean time-to-failure of 200 months to mean time-to-failure that exceeded 2,000 months—a 1000 percent increase in product quality. Workmanship errors decreased by 90 percent. Scrap cost was reduced by 85 percent. Rework costs were reduced by 73 percent. Process yield improved by 80 percent. Manufacturing cost was reduced by 60 percent.<sup>2</sup>
- The General Electric plant that manufactures jet engines in Durham, North Carolina, reduced the number of defects per engine delivered to Boeing by 75 percent and is close to producing twice the output for one major engine with the same number of people within a four-year timeframe.
- In 1995, in a second LSS/HPO effort in a different StorageTek division than the HDA production line mentioned above, within three months StorageTek increased group productivity of four combined departments of knowledge workers by 60 percent and yielded \$400,000 in cost savings.

## Value Proposition



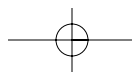
Combining existing powerful disciplines with complementary strengths is a key to success. Table 3.1 provides an overview of Lean, Six Sigma, and HPO disciplines so leaders can understand how the roots of each discipline contribute to the more comprehensive LSS/HPO approach. Additional information on these topics can be found in books and websites listed in the Reference section of the Appendix.

**Table 3.1. Top Leader Overview of Lean, Six Sigma, and HPOs**

	Value Proposition	Critical Assumptions	Hallmarks of Discipline	Key Tools and Methods	Observed Side Effects	Off-Missing Elements
Six Sigma	Principles for process improvement, statistical methods, a customer focus, attention to processes, and a management system focusing on high return improvement projects result in continuous improvement and significant financial gains	Measurement results in process understanding and will guide the way to process improvement A process is in fairly good shape at the start of a detailed data collection and statistical analysis effort Substantial financial incentives for senior managers will cause Six Sigma to be practiced throughout the organization	Statistical methods Fanatical focus on the external customer Attention to process Pre-screening of improvement projects to ensure fit with strategy and a minimum financial return before chartering team People strive for perfection, but noble mistakes are tolerated Top-down implementation lasting eight months to three years Analysis-rich and measurement-rich environment Executive bonuses tied to Six Sigma improvements	Control charts to analyze process variation Charts to determine where errors might occur in a process Regression techniques to determine input effects on outputs Techniques to determine the effect of multiple inputs on output	Target areas for improvement often resist out of fear Senior managers sometimes game the system to get large financial bonuses Six Sigma avoided because of its "bigness"	No direct focus on time or inventory reductions Doesn't focus on quick, large wins High level of motivation exists in internal people trained in Six Sigma, but often not in the general workforce
Lean	Principles for improving workflow, setup time, elimination of waste, and preventive maintenance will speed up business processes and return quick financial gains	Dramatic improvements in cost, time, and quality metrics are possible by focusing on process cycle time and compressing it Effective maintenance can virtually eliminate unscheduled downtime	Identify, prioritize, and address time traps within key processes Eliminate waste Improve quality and simultaneously reduce cost Minimize "things in process," such as work in process inventory Provide make-to-order products to customers efficiently Make visual control and lean production possible by having uncluttered work areas in which work materials are separated from unneeded materials and then neatly arranged and identified	Pull systems Work cells Setup reduction Preventive maintenance Value stream mapping across organizational boundaries	People become frustrated as improvements hit a plateau that requires statistical methods Lack of formal tie-in to management system makes participation strictly voluntary	Cannot bring process under statistical control Motivation for improvement limited to people using the Lean principles

**Table 3.1. Top Leader Overview of Lean, Six Sigma, and HPOs, Cont'd**

	Value Proposition	Critical Assumptions	Hallmarks of Discipline	Key Tools and Methods	Observed Side Effects	Of-Missing Elements
HPOs	A structure composed mainly of high performance teams and a set of operating principles creates a widespread culture of motivated individuals that is highly focused on metrics, extremely execution-driven, and committed to continual improvement and rapid adaptation	Flexible team structures enable rapid adaptation to external challenges Pushing technical and business/managerial decisions down to the lowest level, accompanied by needed information and employee development efforts, create intrinsic motivation for employees to perform at high levels and to actively seek opportunities for continuous improvement	Execution-oriented workforce Technical decisions, managerial decisions, and information pushed to the lowest possible level Teams, not individuals, are the fundamental unit of performance The culture relishes productive conflict and status quo challenges Teams set their own goals and are held collectively accountable Few levels in the organizational hierarchy Top-down and bottom-up implementation lasting one to six months Multi-skilling for flexibility and speed Measurement-rich and feedback-rich environment	Workshops for collective planning, process understanding, and organization redesign Matrices that map responsibilities to individuals and groups Peer technical reviews and evaluations where possible Straight talk Processes for managing culture	Managers become detached from the work of their teams and let teams do whatever they want, compromising organizational strategy or else managers fail to discard old paradigms and micromanage teams Teams become consensus-crazy and decision processes slow	No tools for consistently reducing variation No principles for process improvement provided by HPO discipline; improvements are mainly of the "low hanging fruit" variety, and results of local, isolated innovations initiated within high performance teams

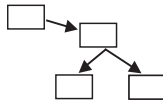


The LSS/HPO value proposition is that an organization can achieve dramatic, sustainable results by integrating:

- Lean's simple improvement principles and tools that focus on waste elimination and process speed;
- Six Sigma's statistical analyses and other advanced methods that focus on reducing variation, plus a financial screening rigor for projects; and
- High-Performance Organization's cultural focus and creation of accountability, energy, and ownership through a new structure and set of principles.

This combination also provides a balance of short-term and long-term gains within an overall improvement portfolio. Applying simple streamlining principles and organizing teams with authority to improve local work flows can produce quick gains within three weeks to two months. Advanced statistical methods that require lengthier data collection and analysis times round out the improvement portfolio by providing gains in a six-month to eighteen-month timeframe.

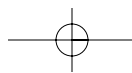
## Typical Outcomes



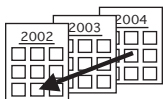
The previous chapters described the basic LSS and HPO outcomes. Organizations that implement LSS/HPO will achieve those benefits plus three additional outcomes resulting from the combination:

1. Easier change management than with LSS alone because HPO specifically addresses culture change;
2. More sustainable outcomes than typically accompany LSS alone because HPTs own their goals and have a mindset of execution and continuous improvement; and
3. More rapid, dramatic gains than with HPO alone since LSS tools provide the HPO teams the LSS tools needed to be successful.

The analogy of a car and gasoline is useful. LSS is the car and HPO is the gas. Put them together and you can go fast to a selected destination. But the car alone without gas—or the LSS alone without HPO—is just an idle combination of simple and complex moving parts. The gasoline alone—like HPO without LSS—can be set afire and produce a lot of heat, but won't get you to your destination. The two need to work together for the best results.



## Brief Historical Notes



In a recent conference, the title of a Lockheed Martin presentation was “It’s not Lean or Six Sigma, it’s not Lean then Six Sigma, it’s Lean and Six Sigma.”<sup>4</sup> The *informal* combination of the elements of waste elimination, statistical tools, teams, and culture change has been going on in selected high performing organizations for years. However, for most organizations, the notion of *formally* planning and integrating Lean Six Sigma and High-Performance Organizations is relatively new.

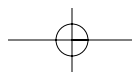
Several companies, however, have formally combined quality improvement and *team-based* organizations (not just organizations that convened and disbanded ad hoc teams). Years ago, Procter & Gamble developed innovative, highly effective work system designs for new plants. Some key people transported successful best practices of combining quality and high-performance teams to different companies such as Weyerhaeuser and Champion International.<sup>5</sup> And finally, although Motorola and AlliedSignal have more noticeably been in the press for Six Sigma, historically they have also implemented Lean and high-performance teams in many successful plants.<sup>6</sup> Historically, the initial focus in the above companies was on planting improvement seeds and watching the evolution unfold over the course of years. This was a slow process. The emphasis with today’s LSS/HPO approach is on speed. Innovations have been made since the early days of connecting the two piecemeal, and the LSS/HPO approach incorporates those innovations.

## Key Concepts



LSS/HPO is far more than just putting activities and tools from each into one work plan. Organizations using LSS/HPO combine the two disciplines into one formalized, well-planned effort to achieve the benefits from both. Consequently, leaders must consider the following four concepts along with those that appeared in the previous two chapters:

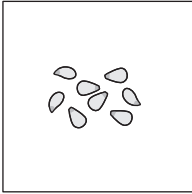
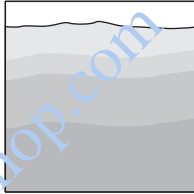
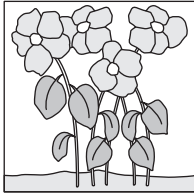
1. The importance of blending the two disciplines;
2. The need to provide both extrinsic and intrinsic rewards;
3. Ownership of process improvement and results; and
4. Critical sequencing considerations.

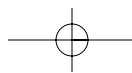


## The Importance of Blending the Two Disciplines

It's slower and far less effective to implement only one of the disciplines initially and then the second. Combining LSS and HPO tools and methods is critical. A garden analogy is helpful (see Figure 3.1). In this analogy flowers are the ultimate financial and human motivation rewards, seeds are the principles and LSS methods of process improvement, and the fertile soil is the execution-oriented culture provided by HPO.

**Figure 3.1. Flower Garden Analogy**

			
Flower garden analogy	Excellent seeds scattered across a concrete parking lot	Fertile soil that has been cultivated and is awaiting seeds	The combination of excellent seeds planted in soil that nourishes the plants and flowers that grow throughout the entire cultivated garden
Implementation strategy equivalent	Lean Six Sigma alone	HPO alone	LSS/HPO
Items requiring compensation or attention	Constant attention required to ensure new plantings find cracks in the pavement, clumps of soil, and water for growth	Fertile soil will grow whatever falls on it and grow it well; without good seeds, good flowers won't grow	Maintain the fertile soil, tend to the existing flowers, plant new seeds



In the case of LSS and HPO implemented separately, expert practitioners may argue that when they implement each of these disciplines they don't encounter the problems mentioned here. And they're right. Experts instinctively compensate. But inexperienced implementers do tend to encounter these problems because of the nature of the methods and how they are typically taught to implement them.

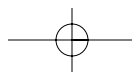
### **The Need to Provide Both Extrinsic and Intrinsic Rewards**

There's no doubt that extrinsic motivators, such as money and stock options, play a role in motivating people. If you have any doubt about that, stop paying people and see what happens to their motivation. Extrinsic motivation is great for some objectives, such as motivating people to implement a given strategic direction and monitoring its implementation. But it often falls short in areas such as increasing people's initiative to seek out potential errors or opportunities and organizing a group of people to address them.<sup>7</sup> Intrinsic motivators, such as allowing workers a say in how work is done and letting them set their own goals, do a better job of addressing this type of behavior, which is absolutely critical in an LSS/HPO. When combined, extrinsic and intrinsic motivation have a significant impact on workforce output and satisfaction.

In 1990 the Brookings Institution's conference on pay and productivity uncovered an important relationship that wasn't even part of the study. When all the results were in, conference chairman Alan S. Blinder concluded from the data that "Changing the way workers are treated may boost productivity more than changing the way they are paid. Worker participation apparently helps make alternative compensation plans like profit sharing, gain sharing, and employee stock ownership plans work better and also has beneficial effects of its own. This theme, which was totally unexpected when I organized the conference, ran strongly through all the papers."<sup>8</sup>

### **Ownership of Process Improvement and Results**

As with most expert-driven projects, at the start of a typical Six Sigma project (without the HPO element or a longstanding successful history of teams in the organization), the ownership for success lies primarily with the expert—the Black Belt. One hopes that, as the project progresses, ownership passes from the Black Belt to the people responsible for implementing and subsequently operating the solution. The challenge in this process is that this ownership tran-



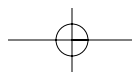
sition process is a change management issue, for which Black Belts are often ill-equipped and under-trained. As Val Larson of Becton, Dickinson, and Company and Mike Carnell point out, the role of a Black Belt is typically described as a “change agent.” In fact, the two terms are frequently used interchangeably in Black Belt training. Ironically, though, while Black Belt training lasts four to six months, there is often just several hours dedicated to the process of effecting change.<sup>9</sup> Quite predictably, passing the baton of responsibility from the Black Belt to the operations group can take a long time, and in some cases it fails to happen at all.

Ownership of improvements evolves quite differently in a team-based environment. Teams want to improve because it is part of the culture and they are rewarded for it, both intrinsically (through job satisfaction and sufficiently challenging work) and extrinsically (through compensation, rewards, and other recognition). Black Belts are not viewed as threats, or superior members in the organizational caste system, but rather as peers who hold a different skill set. The theme of peer-to-peer relationships in joint pursuit of organizational goals is pervasive in an LSS/HPO. This theme fosters a joint ownership of process and results by the Black Belt and improvement team from the first day of the project. In one LSS/HPO organization, I saw a team challenge and assertively question the Black Belt’s process and recommendations the first week of the project. The team wanted to make sure they were making best use of their time and would achieve the best possible results. I have rarely seen such questioning of a Black Belt early in a pure Six Sigma implementation, where Black Belts hold a position of unquestionable, esteemed regard.

In an LSS/HPO, ownership throughout the improvement process resides with the operating group as well as with the Black Belt. However, to achieve that early ownership of the operating group it is important to consider sequencing of LSS/HPO transformation activities.

### **Critical Sequencing Considerations**

There are three general guidelines for sequencing activities in an LSS/HPO transformation. Astute leaders will consider Voltaire’s trenchant observation that “All generalizations are wrong, even this one” when applying these general guidelines. For the most part, leaders will find these guidelines to be applicable to a majority of cases where such judgment is required. The rationale for each guideline is presented below, along with an example of when the guideline might not apply.



### Guideline 1

*Use LSS principles and tools in principally HPO activities and HPO principles and tools in principally LSS activities.* For example, high participation planning events have roots in the HPO discipline, but in an LSS/HPO transformation it's helpful to also have the group discuss continuous improvement and waste elimination in these events. Conversely, it's good to consider the HPO principles of ownership and intrinsic motivation when conducting LSS process improvement sessions. Exceptions to this guideline would be when the purpose, time available, and combination of tools and principles simply do not lend themselves to a combination. An example would be using a group method called "Dialogue" (see Appendix) rooted in HPO to exclusively discuss issues of employee motivation.

### Guideline 2

*Do ownership-generating activities before improvement activities.* A perfect 50/50 balance between LSS and HPO will not always be possible, since many activities have strong roots in one or the other of the two disciplines. In these cases it's best to sequence the primarily HPO activities before the primarily LSS activities, while still trying to include elements of each discipline in each activity. By sequencing the HPO activities in a staggered fashion slightly before the LSS activities, leaders can begin to create buy-in and ownership of the upcoming process improvement related activities.

Figure 3.2 shows the key LSS/HPO transformation stages and sequencing of combined major LSS/HPO activities (A's), predominantly HPO activities (B's, D), and predominantly LSS activities (C's). Details of these major activity blocks appear in Chapter 11, titled "Activity Map and Leader To Do List." An example of preceding improvement activities with ownership-generating activities would be the sequencing of B and C in the Design stage. In B people redesign the structure into HPTs and increase conditions for job productivity and satisfaction. In C people launch process improvement projects. By having B slightly precede C, the workforce is more likely to accept and own the process improvements. An exception to this sequencing guideline would arise in a crisis situation, such as FDA threatening to close a pharmaceutical plant for compliance infractions. In such cases there would be no time to build ownership through massive team goal-setting exercises, and people would need to quickly move to improve the process and avoid a shutdown using LSS methods.

**Figure 3.2. Activity Map for LSS/HPO Transformation**

LSS/HPO Combination	Stage 1: Initiation	Stage 2: Direction Setting	Stage 3: Design	Stage 4: Implementation	Stage 5: Operations and Continuous Improvement
LSS/HPO together	A	A	A	A	A
Predominantly HPO activities		B	B	B D	
Predominantly Lean Six Sigma activities		C	C	C	
Duration	1–2 months	1–3 months	1–4 months	4–9 months	ongoing
Cumulative time	1–2 months	2–5 months	3–9 months	7–18 months	8–19+ months

**Guideline 3**

When considering process improvement, first question whether the process should be done at all, then do Lean methods before statistical Six Sigma methods. Before trying to improve a process, leaders should determine whether or not customers or the market want such a process, at least in its current form. If the answer is yes, leaders should consider applying Lean first. (Since the bodies of research and knowledge of Lean and Six Sigma remain separate and most likely will for some time, it make sense to split them out here.) Most Lean techniques require a shorter learning curve and shorter data collection time than Six Sigma tools. Therefore, for purposes of quick results, it makes sense to first apply Lean methods such as process and value stream mapping and identification of non-value-added activities. However, we don't want to universally apply this rule if other conditions suggest another, more beneficial course of action. An exception would be a machine process that involves very little human intervention, such as a highly automated precision lathe or a bioreactor for cell growth. With minimal human interaction, there is little chance that people will introduce variability in the process. Therefore, process maps and attempts to identify non-value-added activities may yield little benefit and it would be better to start by establishing control charts to identify the impact of the key process inputs on process variability.

## Ten Important “Pay Attention to” Elements



With the combination of LSS and HPO disciplines, leaders need to be concerned with simultaneously introducing improvement methods and establishing a culture of performance and continuous improvement. To do this requires big picture, systemic thinking about how the various parts of the performance puzzle fit together.

The first four elements that help maintain a systemic focus are rooted in a discipline called “systems thinking.” Systems thinking was popularized in the early to mid-90s by Peter Senge of MIT. It can help leaders think creatively about, and effectively address, the big picture for complex issues because it focuses on the interconnectedness of factors in a “system.” The intent of presenting systems thinking concepts here is not to make you an expert. I highly recommend that some people in your organization be trained in detailed tools and principles of systems thinking to assist in the transformation effort. The intent of presenting elements one through four below is to make you aware of, and conversant with, some of the key systems thinking concepts and tools that are relevant for an LSS/HPO transformation. For further information about systems thinking, you may want to read *The Fifth Discipline Fieldbook: Strategies and Tools for Building a Learning Organization*.<sup>10</sup> Elements five through ten below provide additional leverage for leaders in working toward a highly effective, seamless integration of LSS and HPO.

1. *Think in terms of the “structure of systems.”* In systems thinking parlance, a system is a “perceived whole whose elements ‘hang together’ because they continually affect each other over time and operate toward a common purpose” and a structure is “the pattern of interrelationships among key components of a system.”<sup>11</sup> Examples of systems are organizations, business processes, teams, communities, and biological organisms. Senge observed that “systems of which we are unaware hold us prisoner.”<sup>12</sup> LSS/HPO leaders need to pay attention to systems and the structures that determine how they operate and the outcomes they produce. Structures, or the rules that hold the components of a system together, are often invisible and are sometimes constructed unconsciously.

It is helpful for leaders to think about, and in some cases draw pictures of how various components of a system interact so that leaders can take

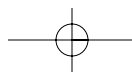
appropriate action. Three basic building blocks for systems thinking that leaders need to consider are

- *Reinforcing loops*, which amplify the effects of an action. Sometimes referred to as virtuous cycles, or vicious cycles, they can be positive or negative for an organization. Leaders must identify critical variables to fuel virtuous cycles (such as increased intrinsic motivation that leads to more improvement suggestions that leads to more intrinsic motivation, and so on) and put the brakes on vicious cycles (people feeling negative about the proposed changes so they sabotage them, resulting in the changes being ineffective, and so on).
- *Balancing loops*, which seek to move the current state to a targeted state, much as the thermostat in a room regulates room temperature to the desired setting. Positive uses of this building block include setting stretch goals and imposing a limiting factor or “brake” on an undesirable reinforcing loop (such as introducing participation to obtain buy-in for the next improvement stage).
- *Delays*, which make the link between cause and effect longer than one might expect. Unless leaders consider and allow for delays, they will often redouble their efforts, thinking that nothing has happened, or, as we used to say in the old TQM days, frequently yanking up the newly planted flowers to see if they had taken root. Each of these actions has adverse long-term effects.

The basic building blocks can be combined to explain workplace phenomena and design ways for improved performance. There are some standard, recurring situations and structures that systems thinkers have dubbed “system archetypes.” More detailed explanations of the specific systems archetypes mentioned below can be found in *The Fifth Discipline Fieldbook*<sup>13</sup> or [www.LeanSixSigmaHPO.com](http://www.LeanSixSigmaHPO.com). One useful system archetype for LSS/HPOs is the Limits to Growth archetype, which contains each of the three building blocks. In an LSS/HPO transformation, workers may have a strong desire to improve operations because they have had a voice in the initial direction setting for their area. This could be a strong reinforcing loop in which intrinsic motivation and improvement each serve as a cycle of cause and

effect for each other. However, a balancing loop often enters the picture because not enough people know tools and methods to improve. There is a delay in getting people trained in both simple and advanced improvement techniques, which leads to a decline in intrinsic motivation. A key strategy to address this Limits to Growth archetype is to zero in on the limiting factor—in this case, dissemination of knowledge through apprenticeships, training, or e-learning—and take action to remove that limit.

2. *Consider undesirable, unintended consequences of positive leadership actions.* The best-intentioned actions may have serious side-effects, and leaders need to consider what those might be. Leaders may try to help teams by making key decisions that the teams need to gain experience in making. (This is known as the Shifting the Burden archetype since the capability to solve problems is shifted from where it belongs to another place). Another example is when some leaders genuinely try to accelerate change by modifying the compensation system before the new skills and organizational structure are in place. (This is known as the Fixes That Fail archetype, as the attempted fix ends up failing to achieve long-term benefits because the new pay system is inappropriately based on old skills and an old structure that both change dramatically in the LSS/HPO transformation.)
3. *Be alert to overburdening key resources and processes.* Problems will invariably ensue when everyone asks for the best talent on their improvement efforts. Burn-out results. It can also result for teams and business processes. For further details of this situation and tips for remedying it, refer to the Tragedy of the Commons archetype in one of the above-mentioned resources.
4. *Encourage and hold fast to aggressive, achievable goals.* Goal setting is a foundation for improvement and for increasing worker intrinsic and extrinsic motivation. Leaders should not permit people to set goals that do not stretch their capabilities, just so the people can say they met their goals. (This specific practice would be classified as the Drifting Goals archetype.)
5. *Periodically meet to understand, not to decide.* For complex topics where people hold widely differing views, it can be helpful to hold a “Dialogue” session (see the Appendix for a detailed description of the Dialogue method).



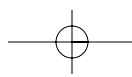
In such a session people strive to surface each other's assumptions and understand the key variables impacting the situation at hand. No decisions are made in a Dialogue session, as this tends to decrease openness and willingness to listen non-judgmentally to others' ideas. Dialogue sessions are then followed up by decision-making sessions once everyone has had an opportunity to better understand the situation and others' views.

Unfortunately, the "not-meeting-for-a-decision" element of Dialogue often scares people off and they avoid Dialogue, thinking it a huge waste of time. I once conducted a Dialogue session for an eighty-person department in a pharmaceutical company. After the session the director came up to me and said she was very pleased with the ultimate outcome, but if she had known the proposed process in advance she would not have permitted it to happen because it seemed unstructured and did not drive to any decisions. This organization now holds regular Dialogue sessions for controversial and complex topics.

6. *Make great personnel selections.* For an LSS/HPO it is essential to have great people in leadership positions. "Great" in this context does not mean charismatic, but rather focuses on the appropriate blend of a results-orientation and people skills. Carole Jacobson, an organization development manager at Weyerhaeuser, has two questions she asks potential managers of high-performance teams: "Do you like people" and "Are you willing to do this type of work the rest of your life?"<sup>14</sup>

Researcher Jim Collins believes people selection to be of the utmost importance. Collins studied details of what eleven companies did from 1965 to 1995 that brought them from good to great companies. In the third chapter of his book *Good to Great*, Collins writes, "To be clear, the main point of this chapter is not just about assembling the right team—that's nothing new. The main point is to first get the right people on the bus (and the wrong people off the bus) before you figure out where to drive it. The second key point is the degree of sheer rigor needed in people decisions in order to take a company from good to great."<sup>15</sup>

7. *Structured assumption checking.* The assumptions that were once valid may no longer be valid. Since assumptions influence behavior, rules, and goals, it makes sense to periodically, in a structured fashion, discuss articulated and unarticulated old assumptions and see if they are still valid.



8. Plan-Do-Study-Act (PDSA) continually. Quality pioneer W. Edwards Deming developed the concept of PDSA to assist in continual improvement. This cycle has applications in both “hard” improvement skills (such as the application of statistical methods) and “soft” skills (such as coaching and self-reflection).
9. *Seek to increase variety and eligibility.* For most people, variety is a great motivator. Giving people more variety in their work provides the added benefit of developing a multi-skilled workforce that can tackle more difficult problems and cover for each other in the event of the temporary loss of a member.

Increased variety goes hand and hand with increased eligibility. In an LSS/HPO, leaders must help people at all levels increase what they are “eligible” to do. This means providing appropriate training and information that accompany new responsibility levels so that the entire organization benefits. When people are provided an opportunity, it is often amazing at how they can excel. In 1760, at the age of 25, John Adams lamented, “I shall never shine (ti) some animating occasion calls forth all my powers.”<sup>16</sup> With the American conflict with England providing sufficient stimulus and opportunity, Adams went on to become a great leader in America’s independence, co-authored the Declaration of Independence, served in diplomatic roles in France and Holland, and was vice president and president of the United States. Similar amazing performance is possible when people in organizations have opportunities that they have not had before.

10. *Establish conditions for and reinforce flawless execution at every opportunity.* Organizations that execute well will consistently outperform those in their industry that do not. When many people hear the recommendation to “actively manage the organization’s culture,” they think it means to make the organization a more fun place to work. This is not the objective of managing culture. The objective is to achieve an execution-oriented culture that fosters ethical behavior. Fun is often a by-product of this, but it is not the primary cultural objective. Top leaders must continually seek opportunities for flawless execution to occur and provide rewards and recognition when it does. In an LSS/HPO, rewards and recognition are most often done at the team level, but can also be done at the individual level.

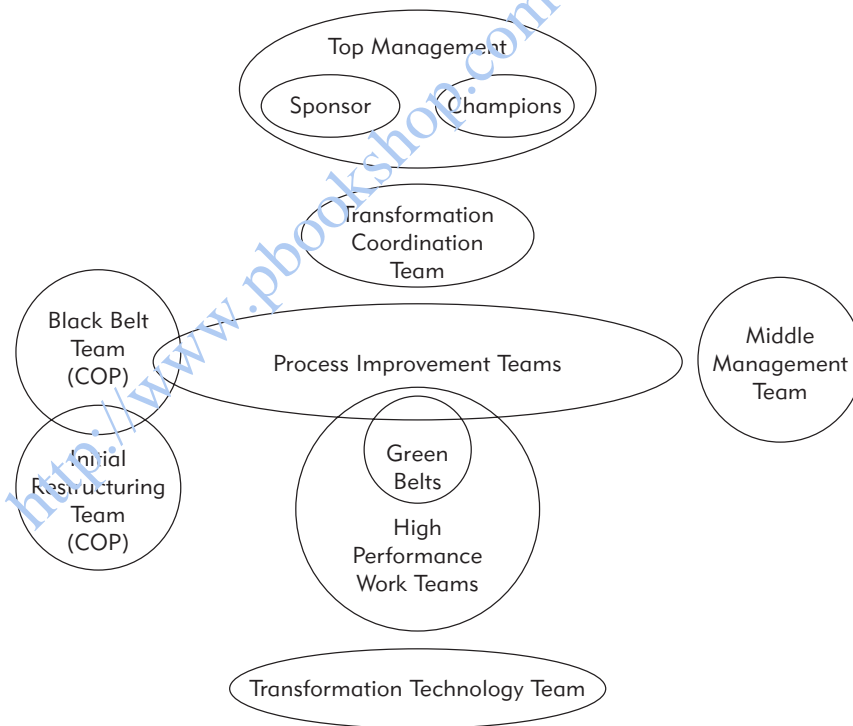
We are now ready to explore the people involved in the transformation and their interrelationships.

## Key Players



Figure 3.3 shows the key groups that organizational members form for the LSS/HPO transformation. The many LSS/HPO structures are represented by ellipses, concentric circles, and overlapping circles and ellipses rather than as lines and boxes connected in a traditional structure.

**Figure 3.3. Key Groups During the LSS/HPO Transformation**

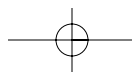


In the figure ellipses contained within ellipses represent subgroups of a larger group; overlapping ellipses indicate that certain individuals are members of both overlapping groups. Ellipses that are not connected does not mean that they have no relationship to other groups. Rather, it indicates that the exchanges of materials or information are negotiated between the ellipse groups and are subject to change as customer needs change.

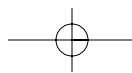
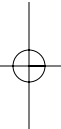
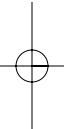
Figure 3.3 makes a distinction between two types of groupings, a *team grouping*, a collection of individuals who share common goals and whose collective skills are needed to achieve those goals, and *communities of practice (COP)*, individuals who share a common interest and periodically gather to exchange best practices and learn more about topics of interest. Table 3.2 describes the critical interrelationships of each of the groups.

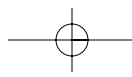
**Table 3.2. Key Group Interrelationships in LSS/HPOs**

Group	Interactions with other groups and notes
Top Management	<p>Provide strategy and restructuring guidelines to Initial Restructuring Team</p> <p>Review process improvement recommendations from Middle Management group</p> <p>Provide initial list of improvement projects (that meet financial screening criteria) and strategic inputs to Transformation Coordination Team for development of the Integrated Work Plan</p> <p>Review improvement project status prepared by Process Improvement Teams and Transformation Coordination Team</p> <p>Model new behaviors and reward desired new behaviors for all groups</p>
Champions	<p>Assist Process Improvement Team in creating business case for the project</p> <p>Ensure appropriate resources are allocated and scope is correctly defined for the Process Improvement Teams</p> <p>Ensure Process Improvement Team is chartered and meets tollgate requirements before moving from one stage of DMAIC process to the next</p> <p>Remove roadblocks for process improvement projects getting completed and meeting their objectives</p> <p>Ensure alignment of operational project goals and strategic organization objectives</p> <p>Major participants in first wave of project selections in discussions with Top Management peers; very responsible for the quality or project selection in subsequent waves</p> <p>Meet periodically as a Champion team to prioritize resource allocation and share lessons learned about being Champions</p> <p>Ensure lessons learned are captured and celebrations of success occur</p>
Sponsors	<p>Provide encouragement to Process Improvement Teams</p> <p>Attend process improvement functions and demonstrate top management commitment to LSS/HPO</p> <p>Sponsors would meet periodically as a team to prioritize resource allocation and share lessons learned about being Sponsors</p>

**Table 3.2. Key Group Interrelationships in LSS/HPOs, Cont'd**

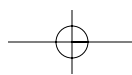
Group	Interactions with other groups and notes
Transformation Coordination Team	<p>Ensure that an Integrated Work Plan is developed that addresses all activities related to process improvement, restructuring, change management, reward and compensation modifications, and other LSS/HPO activities</p> <p>Act as the "project management" arm of the top management to ensure LSS/HPO activities are being accomplished when they need to be. While it is true that top managers need to visibly lead the transformation effort, they should not have to attend to detailed planning, project management, and logistics activities. In some organizations this responsibility may rest with one individual and a dedicated administrative resource (keeping track of all that's happening during the conversion is a significant task). In the new spirit of High-Performance Teams, where the fundamental performance unit is teams, not individuals, organizations may wish to have a team of multi-skilled individuals perform these project management tasks, for which they would collectively be held accountable.</p> <p>Ensure appropriate training occurs and that knowledge is transferred from any external sources to internal sources</p> <p>Provide a central clearinghouse for measurement of progress</p>
Black Belt Team (community of practice)	<p>For the most part Black Belts operate independently of other Black Belts, spending most of their time with process improvement teams and part of their time reporting to their Champion. In an LSS/HPO it is recommended that Black Belts form a "community of practice," that is, a group that periodically convenes with the purpose of keeping their skills sharp in their selected discipline</p> <p>Periodically meet to discuss what's working and what's not in process improvement projects</p> <p>Periodically meet to swap the use of key tools and provide examples of how they were used in the organization</p> <p>In an LSS/HPO there should be an overlap of members of the Black Belt Team and the Initial Restructuring Team so as to cross-pollinate Six Sigma and HPO principles in the context of the actual work occurring in the organization</p> <p>If there is no experience internally in process improvement principles and statistical methods, this Black Belt Team will need to obtain start-up training from an outside source such as public workshops or consultants familiar with these topics</p>
Initial Restructuring Team (community of practice)	<p>Facilitate the initial conversion from a traditional structure to one of high-performing teams</p> <p>Teach all HPT members the principles and tools to restructure to HPTs so that teams can reorganize themselves in the future as external conditions require</p> <p>Provide temporary guidance to new HPTs as they learn to function in the new structure</p> <p>Disband after the initial round of restructuring to HPTs since all HPT members will have learned how to design and operate an HPT</p>

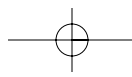


**Table 3.2. Key Group Interrelationships in LSS/HPOs, Cont'd**

Group	Interactions with other groups and notes
	<p>If there is no experience internally in converting to HPTs, this Initial Restructuring Team will need to obtain start-up training from an outside source such as public workshops or consultants familiar with HPT redesign</p>
Green Belts	<p>Learn simple process improvement principles and techniques</p> <p>Apply simple process improvement principles and techniques to their work situation with the assistance of a Black Belt</p>
High-Performance Work Teams	<p>Based on strategic inputs from the Top Management Team and the Initial Restructuring Team, people organize themselves into HPTs under the facilitation of Initial Restructuring Team members</p> <p>As the new official structural units of the organization, HPTs set goals and metrics and negotiate them with the middle managers (either an individual or a team) to whom they report</p> <p>HPTs are held collectively accountable for meeting their goals, first among themselves, and then to their middle manager(s)</p>
Middle Management Team	<p>In an LSS/HPO middle managers interact laterally with other middle managers as well as the traditional vertical way (with one's boss and with one's direct reports), which provides for the integration of work done by the lower level HPTs and also provides a way for middle managers to share best practices in the new skills of leading and managing an LSS/HPO</p> <p>Middle managers become a team that performs tasks that include, in ascending order of complexity: informal information sharing, problem solving, collective planning, and forming a coalition to lead a work group or divisional leadership with minimal supervision from Top leaders.<sup>i</sup></p>
Transformation Technology Team	<p>Consisting of dedicated or nearly dedicated resources, this team provides quick hit and long-term information technology solutions for organizational members involved in the transformation to LSS/HPO. One reason the group exists is to avoid the traditionally long queue times associated with information technology projects. Although new system development requests could be handled with the existing information technology organizational structure, many organizations have found it useful to form a separate team as recommended here</p> <p>Quickly build applications like intranets for transformation (containing communications and project status information) and programs to support analysis and dissemination of lessons learned</p>

<sup>i</sup>This order of increasing complexity of middle management integration was first articulated by Barry Oshry in the book *In the Middle*.





## Hallmarks of the Combined Disciplines



The hallmarks of the individual Lean Six Sigma and HPO disciplines appear in the previous two chapters. An LSS/HPO contains all those hallmarks and, in addition, some unique aspects obtained by combining the two programs:

1. *Speedy acceptance of new improvement concepts.* Because of team achievement, greater control over their work, increased job satisfaction, and collective rewards, teams have a high motivation to meet goals and set new stretch goals. For this reason teams are anxious to learn more about process improvement principles and tools and tend to “pull” these practices rather than the practices being “pushed” from organization unit to organization unit by brute force.
2. *Less top management time required as the implementation progresses.* An LSS/HPO fosters high levels of motivation and a structure that provides for controls through metrics monitoring. Consequently, in an LSS/HPO implementation top management is able to devote less time to shepherding the implementation than with standalone Lean or Six Sigma efforts.
3. *Rapid widespread improvement.* Since HPOs by themselves provide only simple process improvements that don’t capitalize on advanced statistical methods, with an LSS/HPO people enthusiastically receive principles and tools to channel the energy they have for execution resulting from their motivation.
4. *Consistent messages employees can act on.* Management failing to create a supportive culture before distributing tool books such as the Memory Jogger<sup>TM17</sup> with the expectation that employees will use them in their improvement project dooms the effort to failure. I once talked with a manager in a brewery about process improvement there. He boasted, “I know thirty-five process improvement tools.” When I asked how many he’d used in the past six months, he replied, “None. Actually, management never seemed to care too much about us using the tools once we were trained.” This situation is all too common. Implementing LSS/HPO dramatically increases the likelihood of sustaining new mindsets and processes for improvement.
5. *Sustainability of results.* In many LSS implementations after a Black Belt moves on to another project there is often a danger of backsliding—to

old methods and to old performance. This risk is mitigated in an LSS/HPO because people have set new goals for the improved process and are intrinsically and extrinsically motivated to achieve them.

By combining LSS and HPO disciplines, an organization can achieve the benefits of each, plus additional benefits from the combination. The logic of putting LSS and HPO together is inescapable. The combination provides definite synergy by putting together proven improvement methods (LSS) and a rapid way to restructure the organization, foster ownership, and reshape the culture (HPO). However, based on my experience, during early project stages there are sometimes questions about the necessity of the significant operating change associated with deploying HPO. Do we have to do the HPO part of LSS/HPO to get the dramatic, sustainable results? This question and related concerns are addressed in Exhibit 3.1.

### **Exhibit 3.1. Combining HPO and LSS for Dramatic, Sustainable Results**

There's no doubt about it. Implementing HPO definitely requires a different set of leadership mindsets and practices than a traditional functional, multi-layered hierarchical organization. The big question in top leaders' minds is, "Is it worth the effort?" Here is a summary of a conversation I recently had with a CEO considering LSS/HPO. It's about the sixtieth time I've had a similar conversation, so I thought it might be helpful for leaders if I included it here.

CEO: I'm sold on combining Lean and Six Sigma. I like the fact that Lean will help me get quick returns. I like the fact that Six Sigma will help solve the organization's really complex problems. What I'm hesitant about is this HPO part.

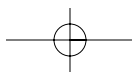
Tom: Okay. Say more.

CEO: It looks like a pretty radical departure from the way we do things around here now. I mean, fewer layers in the hierarchy, people held collectively responsible for work, and decisions pushed down in the organization. . .

Tom: It is a radical departure. It's intended to quickly change the culture and get it in line with the new "hard" aspects of the transformation.

CEO: I do understand that Lean Six Sigma is the "hard" aspect and that we need a "soft" aspect to address culture and the people parts of the transformation. Otherwise the changes won't stick. Improvements may backslide and all that. But I'm wondering, is there another way we could get the same result without reorganizing the organization into teams? Aren't there some companies out there performing exceptionally well with Lean Six Sigma, but that aren't organized into teams?

Tom: Yes, there is another way. And yes, there are some companies doing great with Lean Six Sigma without the HPO aspect.

**Exhibit 3.1. Combining HPO and LSS for Dramatic, Sustainable Results, Cont'd**

CEO: But so far we've only talked about doing HPO with Lean Six Sigma. Who are these other companies, and why can't we take the approach they took?

Tom: The issue is speed. Organizing people into teams is the fastest way to address the "soft" aspects of change. The reason some other companies have been able to be successful at Lean Six Sigma without organizing into teams is because of their existing strong culture that already tends to support initiatives like Six Sigma and Lean.

CEO: "Strong culture?"

Tom: Yes. There's a great book called *Built to Last* by Collins and Porras that emphasizes the importance of culture in the long-range success of a company. Collins and Porras' research showed that companies that pay attention to actively managing culture tend to have a "strong culture" and they consistently outperform industry peers who do not pay as much attention to managing culture. In a strong culture, people know the rules, values, and behaviors expected. This manifests itself in seemingly minor things like people showing up to meetings on time, if that happens to be a cultural norm. In weak cultures people tend to do pretty much whatever they want, because there are no accepted rules or behaviors.

CEO: By your definition, we really don't have a very "strong" culture here. So how does a company go about getting a strong culture?

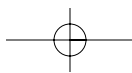
Tom: Strong cultures get built over time through leaders modeling and reinforcing certain behaviors. Stories, myths, and legends about an organization also help spread and reinforce the culture. What people get rewarded for, and what they get punished for, also shape the culture. Behaviors that work get rewarded, become part of the folklore, and tend to be perpetuated.

CEO: So a strong culture would get us what we need from a "soft" aspect of change?

Tom: Actually, I believe a strong culture only gets you part of the way there. The strong culture must also be appropriate for what you're trying to accomplish internally and what that external condition requires. For example, for a culture that works well with Lean Six Sigma, it would need to be a culture that was strong *and* that reinforced values like cross-functional and cross-level collaboration, innovation, intelligent risk taking, not punishing people for mistakes, continuous improvement, people seizing the initiative to fix things without being told, and top and middle managers who believed it was their job to enable the people below them to do the best work possible.

CEO: Sounds like a lot of subtle, behind the scenes work. How long does it take to build a strong culture that has those characteristics and values you just described?

Tom: If you're just focusing on changing culture, it could take five to twenty years to get something like the culture I just described. Just consider trying to instill all those values in a hierarchy with multiple layers, where people had for years been afraid to make a mistake because mistakes cost other people their jobs.



**Exhibit 3.1. Combining HPO and LSS for Dramatic, Sustainable Results, Cont'd**

CEO: Yes, I see how that could be difficult to instill new values as you'd described there.

Tom: On the other hand, if you flatten the organization, restructure people into teams, and push down goal setting and decision making, you can begin to get the desired "soft" aspects addressed in as short a timeframe as one to four months. This is why HPOs are a favored "soft" strategy in trying to support and sustain Lean Six Sigma.

CEO: But you said there are companies who do Lean Six Sigma without organizing people into teams. Let's return to that topic for a moment. Who might some of those be so I have an idea what it might take for us to select the "changing culture" approach?

Tom: Two come immediately to mind. One is Operational Management International, Inc. (OMI). They won the Baldrige Award in 2000. It's a very strong culture that supports all those things I mentioned, which works well for supporting their process improvement efforts. It started building those attributes long before they won the Baldrige Award and then accelerated the shaping of that culture in response to the challenge of trying to win the Baldrige Award. And I suspect they'll have those attributes and values forever because they focus on reinforcing them every day.

CEO: You mentioned two. Who else?

Tom: The other company is Johnson & Johnson. They have a very strong culture built over many years, shaped during reactions to key events, such as the Tylenol poisoning crisis. During that time they recalled all the Tylenol in the field so they could assure consumers and hospitals that the Tylenol supply was safe. I've visited many different J&J sites in different countries, and although it's a highly decentralized company, their core values are present every place I've been. And those core values all support the Lean Six Sigma we've talked about here.

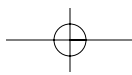
CEO: So they're doing Lean Six Sigma?

Tom: They are doing the essence of waste elimination, process streamlining, and advanced statistical methods. Internally they call the initiative "Process Excellence," and it's yielded quite dramatic results for them.

CEO: And they do this without teams?

Tom: As I'd mentioned, J&J is a very decentralized company. Many parts of J&J are not organized into full-time teams, but some are. It depends on the preference of the organizational unit and the performance challenges they need to address. The Process Excellence methods work well in both because J&J's core values support it.<sup>i</sup>

CEO: Okay, I'm convinced we don't have as strong a culture that supports Lean Six Sigma as a Baldrige Award Winner like OMI. And we definitely haven't been shaping our culture as long as Johnson & Johnson. So it seems we're back to the concept of HPO. Why is it that HPO can bring about the desired "soft" aspect that supports Lean Six Sigma in one to four months, instead of the lengthy five to twenty years required for the culture-shaping process you described?

**Exhibit 3.1. Combining HPO and LSS for Dramatic, Sustainable Results, Cont'd**

Tom: De-layering the organization and having most of the organization restructure themselves into High-Performance Teams are critical parts of the overall HPO strategy, and also why it works so quickly. This process rapidly involves everyone and starts to build local ownership within the teams immediately through local goal setting and collective accountability.

CEO: Yes, yes. It does seem like we're back to talking about very dramatic departures from current management practices. I'm still concerned about that. Isn't there something like an "HPO-Lite" process that we could use that wouldn't be so disruptive?

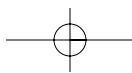
Tom: I understand that you're concerned about how disruptive this will be to current management practices. However, it's the disruptive nature of this process that makes it so powerful and effective.

CEO: How so?

Tom: Many change efforts are ineffective or extremely difficult because people backslide into their old ways of doing things. There is an especially strong tendency to do so in a crisis. And once people slip back, it is hard to regain the lost ground. With the HPO approach described, it is difficult to revert to old ways of doing things because nearly all the undesirable structural and cultural footholds of the past are removed. A manager's direct reports can't blame her if the direct report's goals aren't met, because the team set the goals. Unhealthy competition to claw one's way to the top of the corporate ladder dissipates as the new structure flattens and people are rewarded for skills held, meeting goals, and the organization's overall success. People can't complain they never get a say in how things are done because everyone was involved in redesigning the work group. In addition, teams have the ability to reorganize as external or internal conditions dictate. Slackers who are on teams can't continue to hide and slack off. They are watched by and dealt with by all the team members, instead of just by their immediate supervisor as in the old environment. And people rise to the occasion to improve their processes because their intrinsic sense of accomplishment and their group bonus are based on meeting those goals that they themselves set. These are just a few of the things that are different that represent new paths that must be gone down, and old paths that have been closed off after the HPO redesign activities.

CEO: I see. And it sounds like that's going to do more for us than just a good solid toolkit.

Tom: The tools will work fine, for what they do. Control charts will still track a key variable over time and allow us to look at its average and variability. Pareto charts will still help us separate the vital few from the trivial many. But transformations don't fail because the tools don't work. We know the tools work—they're mathematical. Transformations fail because of the people part of the change equation. And it's the people part that we're trying to address, as quickly as possible, so that the use of the tools can be enthusiastically supported now, and forever. The HPO strategy addresses the people side of change very quickly and effectively.



**Exhibit 3.1. Combining HPO and LSS for Dramatic, Sustainable Results, Cont'd**

CEO: Okay. I'm beginning to see that, although the HPO method of change is quite different from what we're used to, it can be quite beneficial in accelerating the culture change needed to support LSS/HPO sustainability. And it seems to be a more viable alternative than trying to keep our existing structure and operating practices and embarking on a major culture change effort. I guess the only thing still gnawing at me is this whole business of pushing decisions down to these newly formed teams. Are there any sort of controls that can be put in place to make sure they're not just running wild and doing their own thing?

Tom: Absolutely. In fact, there can actually be more controls in an LSS/HPO, because as decisions are moved to lower levels, controls are also designed in to ensure fit with strategy and to report progress and trends. The website [www.leansixsigmaHPO.com](http://www.leansixsigmaHPO.com) provides details.

CEO: Okay. I'll take a look at it before we get together again next week and decide next steps. See you then.

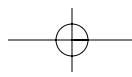
Tom: See you then.

<sup>1</sup>Personal conversation with Karl Schmidt, vice president of process excellence for Johnson & Johnson.

**What It's Not**

An LSS/HPO is not a strong implementation of one discipline (either LSS or HPO) with a diluted implementation of the other, just to give the appearance that the change effort addresses both "hard" and "soft" aspects. To achieve truly radical benefits, maintain profit sustainability, and create a cultural mindset of continuous improvement it is necessary to strongly pursue both disciplines simultaneously.

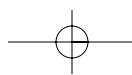
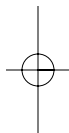
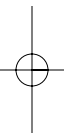
It is not two sets of tools and principles tossed into one implementation bag for later independent removal and application as needed. An LSS/HPO effort must be a blended one to succeed. LSS process improvement events also need to contain reminders of the new culture. HPO restructuring events must establish goals in the context of continuous improvement and identification of where statistical tools may help. While events may have originated in the LSS or HPO discipline, the majority of time in an integrated LSS/HPO transformation they need to contain the other element.

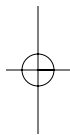
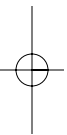
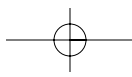


Now let's move on to the Pragmatic Practice part of this book, where you'll learn how to implement the tools.

### Notes

1. Personal conversations with Rob Tripp, Mike Carnell, John Lupiensi, and J.F. DeBetz.
2. Personal conversation with Robert Rehm and Gary Frank, who were both StorageTek employees during the dramatic turnaround.
3. Fishman, C. (1999, October). Engines of democracy. *Fast Company*, 28, p. 174.
4. George, M. (2002). *Lean six sigma*. New York: McGraw-Hill
5. Personal interview with Carole Jacobson of Weyerhaeuser on March 26, 1999.
6. Personal interview with John Lupiensi of Motorola and personal interview with Rob Tripp, who worked at AlliedSignal in the Maryville, Tennessee, facility.
7. Argyris, C. (1998, May/June) "The emperor's new clothes." *Harvard Business Review*.
8. Blinder, A. (1990). *Paying for productivity: A look at the evidence*. Washington, DC: Brookings Institution.
9. Larson, V., and Carnell, M., "Surviving the valley of despair and pity city." [www.isixsigma.com](http://www.isixsigma.com).
10. Senge, P. (1990). *The fifth discipline: The art and practice of the learning organization*. New York: Doubleday.
11. *ibid*
12. *ibid*
13. Senge, P. et al. (1994). *The fifth discipline fieldbook: Strategies and tools for building a learning organization*. New York: Doubleday.
14. Personal conversation with Carole Jacobson on May 12, 2000.
15. Collins, J. (2001). *Good to great*. New York: HarperCollins.
16. McCullough, D. (2001). *John Adams*. New York: Touchstone.
17. Brassard, M., Ritter, D., Rilter, D., and Oddo, F. (Eds.). (1994). *Memory jogger II*. Methuen, MA: Goal/QPC.





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