

Profit Improvement Executive Analysis

Insights into a century of cost reduction and profit
improvement

What works...What fails
What you must know to make a choice

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By

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Executive Summary

As I am updating this paper in 2011, the news about Six Sigma, Lean and its various combinations is mixed. It is apparent that further evolution if not revolution of continuous improvement programs is required. This paper will help you understand the benefits and issues associated with the most popular cost reduction and profit improvement programs today and offer constructive alternatives.

Companies are saying that they must have the following to compete and hopefully establish a competitive advantage:

1. A means of deliberate innovation
2. Pathways to increased profitable revenues

It is no longer acceptable to commit to Lean even if there is no clear path to a financial return on investment. We can no longer accept six-sigma quality at any price.

The good news is that there are paths to success. It is possible to build on the foundation of existing continuous improvement programs and take them into the 21st Century.

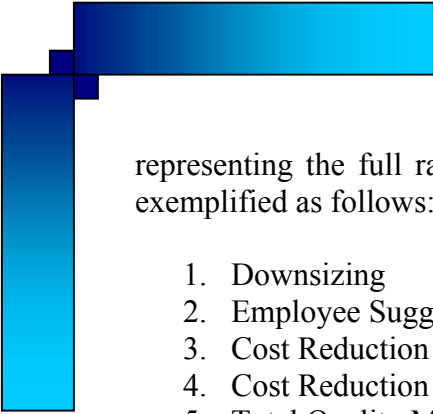
We have learned a great deal about cost reduction programs, Six sigma, Lean, combined Six Sigma / Lean and other forms of Continuous Improvement Programs in the past two decades.

Some practitioners would say that one in twenty companies that try has succeeded. I hold the revolutionary (or at least contrarian view that the very definition of success is flawed and the success rate is actually higher. I think that this news does not represent the end of Continuous Improvement, Six Sigma and/or Lean but it does cry out loudly and clearly that it is time for change. We need to move these programs out of the cutting mode into a new evolution that supports innovation and profitable revenue growth.

Here are my recommendations based on observations of the past two decades:

1. Consider Continuous Improvement as a means to an end and not an end in itself
2. Separate tools and processes from dogma
3. Accept that the partial use of some of the principles may be more appropriate for the organization than dogmatic, mass implementation
4. Apply a progressive approach of learning, adapting and adjusting as the better way forward for most companies
5. Recognize that the basic tenet of continuous improvement demands that the programs themselves must be flexible and continuously improve.

This paper provides insights into a wide range of tools, methods, and processes for increasing corporate profits. It cuts through the popular hype to the essence of the financial and non-financial considerations for eight significant types of methods



representing the full range of methods in use today. These types are categorized and exemplified as follows:

1. Downsizing
2. Employee Suggestion Programs
3. Cost Reduction Projects
4. Cost Reduction Process
5. Total Quality Management (TQ)
6. Six Sigma / Six Sigma Lean
7. Lean
8. Profit Improvement Process

This research and discussion break down the barriers between fact and fiction to help the reader sort function from fad. **High profile press attention does not guarantee that any particular method is either effective or appropriate for an organization.** The worst choice, however, is to do nothing while the world changes around you.

An improperly selected or supported method, however, may cost more than it produces. Collateral damage from methods such as downsizing can be extreme to the point of corporate failure. Companies are often worse off after their attempts at improvement. **No company has ever cut its way to growth.** Balance is difficult but vital: “Pursuing new growth is no excuse for neglecting core-business excellence. But watch out for the trap at the other extreme: using the focus on core operations as an excuse to defer serious new-growth moves. **This can easily become a permanent state of mind as management fixates on a stream of quality and productivity initiatives, squeezing out ever-smaller returns from the same core business and neglecting the foundation of the company’s future. It’s a delicate balancing act, and mastering it is the key to long-term growth. [1]”**

A properly selected and well installed profit improvement method or initiative can benefit any organization no matter what type of company, what growth stage it is in, and what the current profitability is. **The case is made for a balanced approach that accommodates innovation and revenue growth.**

As this report is updated in April 2011, the United States has officially been out of the recession of 2008/2009. Unemployment is still high around the globe and it is likely that full job recovery will be years ahead. Businesses are still failing and government debts are exceeding “realistic levels” around the globe. I encourage you to take action by whatever means you find appropriate to continue to conserve cash and improve your balance sheets. **This is what you need to know to make the best management decisions you can for the future of your company.**



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Profit Improvement - Executive Analysis

1. Introduction:

If you have profits on your mind you are in good company. Cost Reduction is touted as the saving grace time and time again. Even while the economy was healthy in 2000, 31% of chief financial officers surveyed said that reducing expenses was most critical to their business in the next two years [2]. A search in the Dow Jones Interactive database found the phrase “cost reduction” 40,371 times for the last fifteen and a half years in everything from business journals to quarterly reports. It’s the “We’ll do better next quarter.” mantra. Now in 2009 as the economy slows globally and the cost of doing business soars, profits come to mind even more.

If you are at all confused about the plethora of management initiatives for improving profits, you are again in good company. It’s hard to sort the wheat from the chaff. Some of the shining examples of profit initiatives collapsed with disastrous results while others just keep on quietly producing. This white paper will help you sort things out. It makes a case for and discusses the various options for taking action to increase corporate profitability. Options are compared and recommendations are made for profit improvement

In the summer of 1996 Albert Dunlap took command of the chief executive office of Sunbeam Corporation. He was there at the behest of the board of directors to pull off another of his miraculous single-handed turnarounds as the then undisputed master of profit improvement. He cut, slashed, adjusted, and manipulated to record profits in his well know style [3]. By June 1998 he was gone [4]. In February 2001 Sunbeam filed for Chapter 11 bankruptcy protection and in May the Securities and Exchange Commission named Dunlap and four other ex-Sunbeamers in a suit that alleged they “engaged in a fraudulent scheme to create the illusion of a successful restructuring of Sunbeam. When Sunbeam's "turnaround" was exposed as a sham, the stock price plummeted, causing investors billions of dollars in losses.”[5]

General Electric, however, under the stellar leadership of Jack Welch has added an estimated additional \$7.6 billion to their bottom-line (at a cost of \$2.1 billion) for the period 1996-2000 using Six Sigma. GE stock had been holding value relatively well in spite of a rocky market until 2008 when it plummeted and now continues to trade at about a third of its peak valuation. And, by the way, don’t believe that huge GE savings number. There is a rising swell of criticism over exaggeration of Six Sigma benefits. Motorola who invented the Six Sigma concept in the early 1990’s and has built it into their corporate culture announced layoff’s of 26,000 people (about 18% of their workforce) in the first four months of 2001 [6] on the heels of plummeting market capitalization. They have now split up the company trying to somehow increase lost shareholder value. Motorola has been absolutely hammered by the global competition and may never recover.

Employee suggestion programs have been around for over 100 years and employee involvement programs became popular in the last half of the 20th century. These programs are based on the principles that employees are best suited to know where improvements should be made and are motivated to take action. **While this sounds good, there is uneven research support for the concept.** It doesn't always work as expected.

Many programs have been quite successful but for a majority the results have been disappointing or quite poor [7]. Most programs just fade away in silence.

There is clearly no silver bullet as any initiative can miss its targets or backfire in some circumstances. Despite these troubling results, the good news is that there are a number of things you can do to maximize your chance of success. With careful analysis, planning, and execution **it is possible for you to beat the odds and change your company for the better.** Read on as we discuss how to succeed where so many others have failed with traditional approaches to profit improvement. **We make the case for profits and continue with a discussion of the common practice of downsizing and layoffs followed by an overview of alternative approaches and specific recommendations on how to succeed.**

2. The case for profits & the profit equation

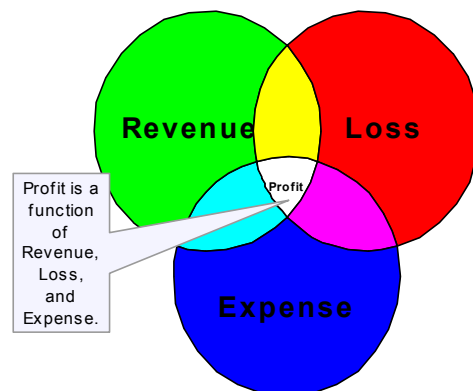
The case is simple. Profits are the fuel of our economic engine and your corporate survival. In 2005 the stock market is rewarding profitability.

The Dot-com frenzy of the 1990's seemed to suspend the natural law of gravity. Profit, for a while, didn't seem to matter as much as flash and sizzle. The stock market correction of 2000 when 1.5 trillion dollars of capitalization disappeared in a flash was a wakeup call to remind us that profits are still the underpinnings of our economy. There is no question that business must achieve and continuously improve profits.

Even when companies decide to change and improve profits most of their efforts are unfortunately destined to fail to achieve their goals. The call to action is rarely more than a management directive to "cut expenses." Their efforts are all too often improperly designed, negatively motivated, and poorly installed. A mandate without supporting structure and training is empty.

An unorganized cost reduction effort can have an effect like yo-yo dieting. Costs cut in an unsustainable manner often come back in spades. There is much more to achieving success. Let's look at the profit equation to understand how it can be influenced.

Figure 1 The Profit Equation

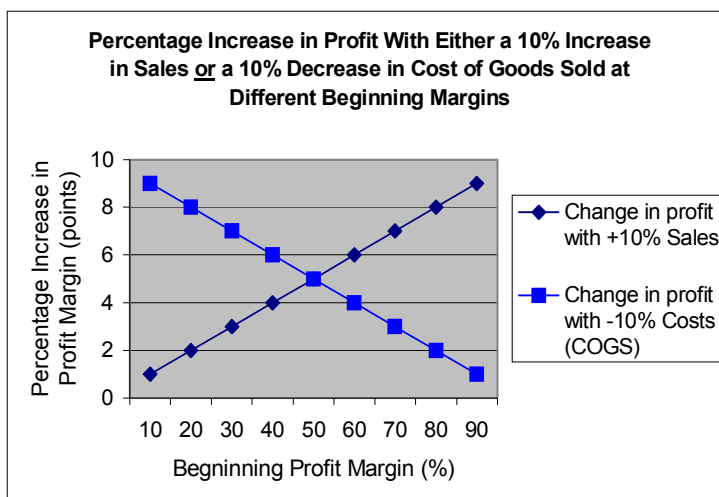


Profit, simply stated, is a function of revenue, loss and expense as shown in figure 1. Revenue is the gross income generated by sales, investing and other sources. Loss represents expenses attributable to mistakes, waste, errors, insurance loss, inefficiency, and quality problems. Expense is what is spent on the seven vital resources that are used to create value: financial, material, space, time, energy, knowledge, and people. Profit is what is left at the bottom line after loss and expenses are deducted from revenue.

Leverage of action is a key concept for profit improvement. The reality is that, depending on your cost structure; actions in revenue or loss and expense will drop to the bottom line differently. In general a dollar saved in loss or expense will report directly to the bottom line.

Only part of a dollar of increased revenue will report to the bottom line, as variable costs of sales must be subtracted. Figure 2 illustrates the relative impact of a change in sales and costs of sales versus various profit margins. For example, if your margin 20%, you must increase sales \$5.00 to put one dollar on the bottom line. The relative impact of changing the cost of sales and revenue are equal at a 50% margin. On a percentage basis, when the margin is over 50% you will get more impact from increased sales than a reduction in the cost of sales and vice versa.

Figure 2 Leverage of change in cost or revenue as a function of margin



In the long run, it is wise to consider all three elements of the profit equation simultaneously. The bulk of long-term profits may often be found inside existing revenue sources. Employees are challenged to create and innovate new ways of using existing customers, products and associated infrastructure to create new sustainable profit sources. This is building rather than cutting. “You cannot cut, outsource or downsize your way to economic success; you have to grow. Growth, very simply, is the one business imperative. [8]”

Profit enhancement methods may be characterized by how they interact with the profit equation in an attempt to increase the bottom line and that is one of the methods used in the following overview.

3. Overview of profit improvement methods

The majority of companies rely on traditional management techniques to steer the course of the corporation. That is to say that the focus is on maximizing revenues and hitting budget to reach target profits. While corporate managers and personnel are driven to meet specific operational goals decisions and activities may be undertaken independent of their impact on profitability. **In fact, the profitability of decisions is rarely well understood much less actually managed.** Profit usually takes center stage only when targets are not met.

Missing quarterly profit projections or annual goals may bring the knee-jerk response of attempting to make a quick adjustment to the bottom line. Method selection is often made reactively rather than proactively. Planning, analysis, and careful method selection might get short shrift in the rush to results.

This overview and the following summaries will help. For the sake of clarity widely

adopted and recognized methods are discussed. There are hundreds of named methods, tools, and initiatives that, to the greatest extent, may be placed into one of the categories/methods discussed here. They are listed in Table 1 and shown here in figure 3. Figure 3 illustrates where these programs and methods impact the profit equation.

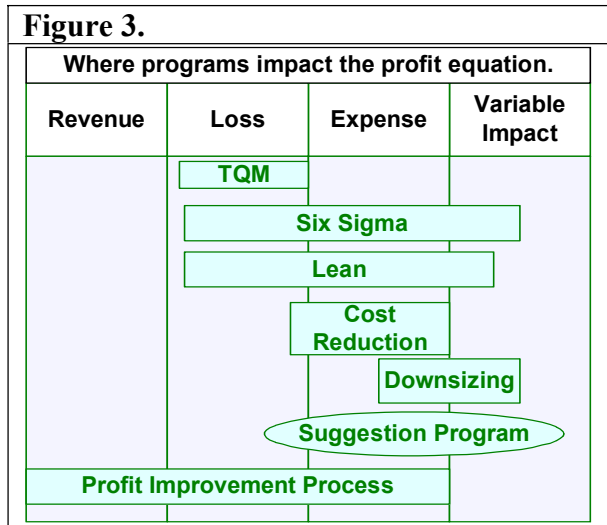
Each of these methods has four major components to varying degrees. The formalization of these steps is expressed in its structure.

1. A particular perspective that defines its approach and objective.
2. An associated language or jargon
3. Preferred tools and techniques
4. Change methods

Appendix A includes a tabular summary of these select methods in greater detail including relative structure, cost to install, profit impact, benefits and concerns. You might find this table to be a useful reference as the paper covers each one in more detail following this section. Appendix B provides a tool classification based on the perspective (e.g. quality or process).

3.1. **Financial impact & structural classification of profit improvement methods**

Profit enhancement methods may be classified in terms of the relative profit impact and level of the structure of the process shown in Table 1 and Figure 3. Impact is



considered only in terms of measurable profit. Non-financial impact is discussed later. Structure refers to the degree of formalization of the process. A suggestion box on the wall and a supply of forms with no rules represents very low structure. A Total Quality Management (TQM) or Six Sigma program with the attendant reams of rules, regulations, and procedures represent very high structure. Structure has distinct costs and benefits depending on the context. Structure, in general, has real costs to build and maintain but, on the other side of the coin, it should be recognized that little gets done without it. Structure is the foundation for continuity and effectiveness of effort. It is critical that you match the method to your goals and your corporate culture. A miss-fit will misfire.

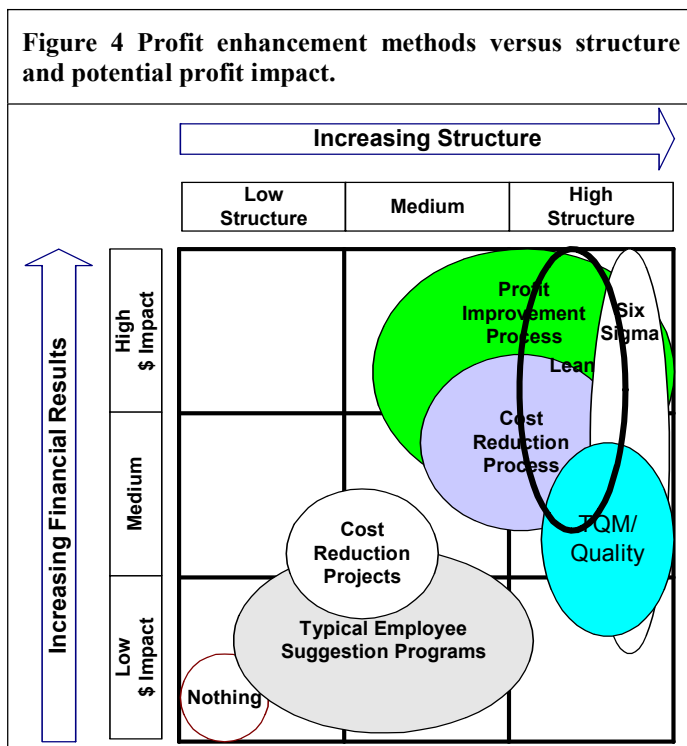
Table 1 Profit improvement method with relative profit impact and degree of structure.

Method	Profit Impact	Structure
Nothing	Low	Low
Downsizing – mass layoffs	Negative to Low	Low
Employee Suggestion Programs	Low to Medium	Low to High
Cost Reduction Project (finite scope)	Low to Medium	Low to Medium
Cost Reduction Process (ongoing)	Medium to High	Low to Medium
TQM (Quality based methods)	Medium to High	High
Lean	Medium to High	High
Six Sigma	Medium to High	High
Profit Improvement Process	Medium to High	Medium to High

Figure 4 depicts the relative position of profit enhancement methods in terms of impact and structure.

Increased structure generally results in a greater impact but may also carry higher costs.

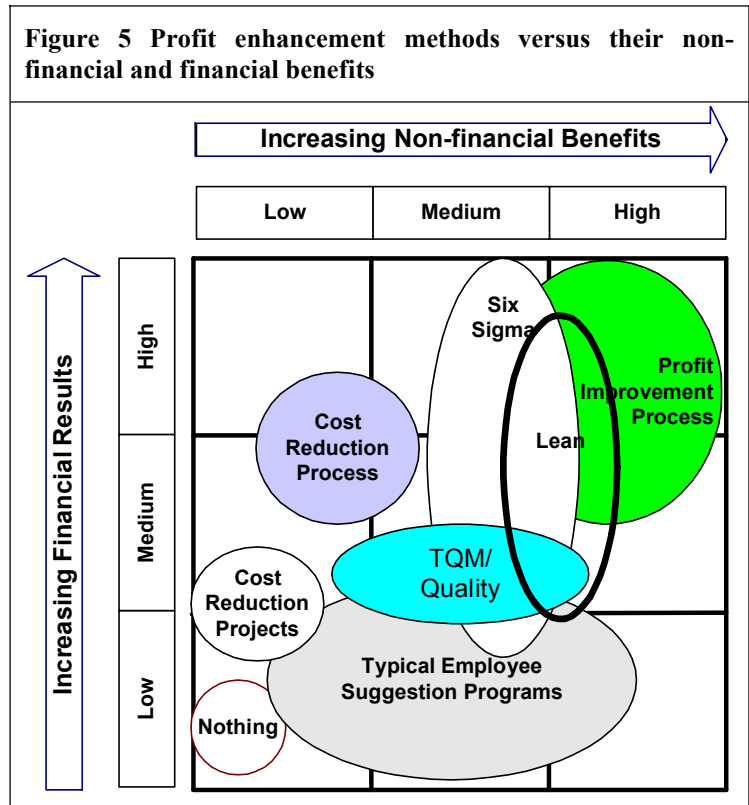
In the ideal world, only enough structure and its attendant cost would be required to gain the maximum benefit. As can be seen here in the placement of the shapes representing each method, they can produce different results depending on how and where used.



3.2. Non-financial impact

Although our emphasis is on financial benefits, it is important to consider the non-financial impact that these methods might have on the organization. Most of these non-financial elements will eventually impact the bottom line. Relative financial and non-financial benefits by method are shown in Figure 5.

It is critical to understand that all of these methods represent change. Change, although necessary to growth, is not always seen or experienced as a positive thing. Most people do not like change and will act to preserve the status quo. The extent to which the profit enhancement method does or does not accommodate the personal aspects of change will have a significant impact on the overall outcome of your profit improvement initiative. As will be discussed in the following section on downsizing, the human cost of significant layoffs is often so great as to negate the potential cost savings.



In the ideal world participants in the process will be intrinsically motivated to actively participate and support the change and will derive personal benefit from the process. They will be enriched and the company will prosper. Some of the non-financial impacts include the following:

- Morale
- Motivation
- Attitude
- Teamwork
- Communication – internal and external
- Ability to accommodate and/or lead change
- Problem solving skills
- Business skills
- Understanding of the profit equation
- Quality of product/service
- Quality of work life
- Safety

- Understanding of and focus on goals
- Perception of the company by people on the outside (e.g. customers; investors)
- Perception of management

Depending on what you do or do not do as leaders and managers, the impact of your decisions will be negative, neutral, or positive. It is, for example, vital that you choose your profit improvement methods very wisely. As some of the cases referenced in this paper show, bad choices can backfire with catastrophic results. It is not uncommon for managers to jump into an initiative only to find out that it really doesn't fit the company's needs or culture. Backing out of initiatives can make management look like fools at best and incompetent at worst. On the other hand, [good choices reinforce a sense of competence and leadership](#).

Let's examine profit improvement methods starting with the choice to do nothing.

4. Do Nothing

[Doing nothing beyond applying routine management practices tends to sustain the status quo](#). Whatever level of efficiency and inefficiency you have, will persist. Profitability is quite possible under these conditions until something changes to disrupt the balance. These changes include such things as:

- New competition with better products, prices, and/or delivery
- Product obsolescence (product life cycle)
- Law or political changes
- Customer changes
- Increased costs of doing business (e.g. people, materials, services, etc.)
- Economic disruption (e.g. downturn, recession, currency exchange rates)
- Etc.

The bottom line reality is that change is inevitable and the business methods that worked yesterday may be obsolete tomorrow.

[In the absence of a definitive and continuous process for adjusting to change, “do nothing” companies must react to change when it occurs](#). We see the headlines announcing such reactive responses almost every day as companies announce mass layoffs and other business cutbacks.

The benefit of the “do nothing” approach is that those who are comfortable with the way things are won't have to work hard until trouble arrives. The costs of waiting until it is too painful not to change, however, are far more severe than this modest benefit. These costs include the following:

- **It may be too late.** The Chapter 7 and 11 bankruptcy landscape is littered with the bones of companies who never recovered.

- **Alternatives are limited.** Without a workforce already trained in profit management, time is limited and alternatives are often limited to the following:
 - Cut personnel cost with layoffs – As discussed, these can have negative effects.
 - Limit R&D – limit the future
 - Cut back on travel – How do you know what travel is unimportant?
 - Limit raises and other compensation – Impact on morale?
 - Limit or cut department budgets – How do you know how deep to cut without hitting the bone?
 - Cut capital expenditures
 - Slash inventories
 - Reduce or eliminate dividends or profit sharing
 - Reduce customer service – This may be an unintended outcome.
- **Reactive responses such as these are unhealthy.** Many of these actions can be done well for good effect but they are *rarely* done well in the frantic rush to make the month or the quarter look good. The near and long-term reactions will inevitably have to be paid for.

5. Downsizing

By any name: downsizing, right-sizing, reengineering, or mass layoffs the result is the same - people are lose their jobs. Many companies swing the ax with the full expectation that this action will improve corporate value. But here's the real story.

Layoffs to cut costs are an all too typical response to an urgent need to improve profits. In the first four months of 2001, Motorola, Daimler/Chrysler, Lucent Technologies, Verizon, Proctor & Gamble, Sara Lee, Whirlpool and Xerox announced a combined total of 106,000 layoffs. Perhaps they believe that Wall Street will reward them for their bold management decisiveness. The pace of layoffs continues unabated in 2003, bounced back for a while and the recession of 2008 put millions of workers onto the streets around the globe.

Personnel costs are a logical place to focus as they typically represent a major cost element. The research, however, on corporate downsizing does not paint a very encouraging picture. Not only are corporate goals of profitability and/or shareholder value usually *not met*, the negative impact on the employees and the companies are *severe*. The Sunbeam example in the introduction is perhaps the most egregious but there are many more.

A survey of 1,005 firms by the Wyatt Company suggested that most restructuring efforts fall far short of the objectives originally established for them[9]:

- Only forty-six percent of the companies said their cuts reduced expenses enough over time, in part because four times out of five managers ended up replacing some of the very people they had dismissed;
- Fewer than one in three said profits increased as much as expected; and
- Only twenty-one percent reported satisfactory improvements in shareholders' return on investment.

Mitchell & Company examined what happened to the stock prices of sixteen companies in the Value Line database that wrote off ten percent or more of their net worth [10]. On the day that the announcement is made, stock prices generally increase, but then there usually begins a long, slow slide. Two years later ten of the sixteen stocks were trading below the market by seventeen to forty-eight percent and, worse, twelve were below comparable firms in their industries by five to forty-five percent.

A 1997 study by Cascio, Young and Morris [11] showed that downsizings had negligible impact on firm profitability relative to the size of the layoffs. Further, the research did *not* produce any evidence that downsizing firms were generally and significantly able to improve profits.

5.1.1. Goal: Improved Corporate Function

A General Accounting Office survey of 416 companies that embraced downsizing found that more than half indicated that they are now understaffed, 44% reported problems meeting deadlines, and 26% stated that business growth was impeded [12].

Downsizing has a negative impact on employees' health. A paper in The Lancet October 17, 1997 reports downsizing is a risk to the health of employees. Dr. Jussi Vahtera and colleagues from the Finnish Institute of Occupational Health, Turku, Finland, found that "Individuals who remain in work during a period of economic recession may suffer from an increase in ill health. The extent to which employees' health was affected depended on the degree of downsizing. The rate of long-term sick leave (more than three days off work) was 1.9 to 6.9 times greater after major downsizing than after minor downsizing. Overall, long-term sick leave increased by 16 to 31 percent during this period of downsizing."

Luthans and Sommer report investigations [13] that downsizing is a decision that organizations need to consider carefully and not enter into lightly. The impact is organization-wide. To be noted, this organization (studied) suffered consequences in spite of its noted culture of concern and support for its members. The implication is that negative effects might be more pronounced in organizations that do not possess just a "family atmosphere." This study has shown potential detriments to employee morale; however, downsizing has a related potential impact that cannot be overlooked. Once an organization downsizes, it has crossed a line it can never go back. As anecdotal evidence has illustrated (e.g., IBM), there is a trust factor that is irreparably changed.

A poll of 1,142 companies that recently downsized, conducted by the American Management Association, revealed that nearly half were "badly" or "not well" prepared for the dismantling, and had not anticipated the kinds of problems that developed subsequently. More than half reported that they had begun downsizing with no policies or programs--such as employee retraining or job redeployment--to minimize the negative effects of cutting back. [Succumbing to the pressure to produce short-term results, many ignored the massive changes in organizational relationships that result from reorganization.](#) As one observer noted, "In the process, they misused and alienated many middle managers and lower-level employees, sold off solid businesses, shortchanged research and development, and muddled the modernization of their manufacturing floors. [14]"

5.1.2. Summary

[The bottom line on mass layoffs is that the results are disastrous at times and mixed at best.](#) It's like cutting off your left arm because it hurts. If the diagnosis was gangrene, you might have even saved your life to go on to win the Nobel Prize. On the other hand, the shock might kill you. [There are better alternatives.](#) It is, for example, far more effective and far less painful to maintain a balanced workforce with continuous productivity improvement.

6. Employee Suggestion Programs

[Employee suggestion programs have been around for over 100 years in business.](#) The first suggestion box was hung on a palace wall in 1721 by the eighth shogun of Japan, Yoshimuni Tokugawa. Suggestion programs are included under the broader classification of employee involvement programs. Employee involvement programs have enjoyed varying degrees of popularity since the mid-20th century. They are based on the popular precept that people want to do the right thing at work and will act on that thought.

Wide use and apparent success in Japan drove rising popularity in the West in the 1980's and early 1990's. Employees of companies with world-class suggestion systems such as Toyota commonly contribute 50 or more ideas per person per year with implementation of about 80% of the ideas. Employee participation is essentially 100%. Suggestion systems are an integral part of Japanese quality and continuous improvement programs. [The story is different in the United States according to a 1992 report from the Employee Involvement Association. Participation in formal programs is about 8% with 2.4 ideas per person per year and an implementation rate of 35%.\[15\]](#) Companies without formal programs don't even do that well.

Major differentiating factors for the wide range of possible suggestion program formats include the following:

- Degree of formalization of program: little to a lot
- Degree of centralization of operation & control: distributed to centralized

- Compensation: compensated or uncompensated

In general it may be said that the higher degree of formalization, the higher the productivity of the program. **Unstructured informal programs are rarely productive.** A minimum level of structure is required to engage, motivate and enable participants. On the other hand, if the structure is too bureaucratic (i.e. slow) it will stifle productivity. The key is to find the proper balance for the corporate culture and desired objectives.

The appropriate level of centralization is a function of the program, desired objectives and corporate culture. This must be designed on a case by case basis.

Compensation for participation is one of the most critical decisions to be made when designing a program. The Japanese rarely compensate. Practices in the West range from no compensation to highly structured compensation packages. The Norwegian national program, as an example of high structure, is administered under strict rules negotiated between industry, union, and government. Proponents of compensation say that money is a prime motivator (external and tangible).[16] Opponents point to extensive research that intrinsic motivation (internal and personal) is the more powerful and lasting form of motivation [17]. The following table lists some of the pros and cons of compensation.

	Pro	Con
Compensated*	<ul style="list-style-type: none"> • Shares the financial benefits with participants • Some cultures like pay for performance • May encourage hourly and/or union participation 	<ul style="list-style-type: none"> • Can create unhealthy competition for credit • Encourages exaggeration of financial benefits • May come to be seen as a right rather than a reward • Very difficult to change and adapt as circumstances change • May skew focus and priorities • Can lose impact • Distracting to principles of teamwork and quality
Uncompensated*	<ul style="list-style-type: none"> • Keeps focus on recognizing & rewarding personal contributions – intrinsic motivation • Flexible to keep fresh and/or adjust to changing circumstances • Focuses on doing the job well overall • Does not distract from teamwork and quality 	<ul style="list-style-type: none"> • Requires a high level of management recognition of contributors • May be more difficult to engage hourly and/or union participation

	Pro	Con
	principles <ul style="list-style-type: none"> • Does not rule out profit sharing plans that consider overall corporate success 	

* A compensated plan is defined here as one that has a formula for sharing the financial benefit of the idea directly with the contributor (e.g. some percentage of the savings). A company with an uncompensated plan may have a profit sharing plan but it is not tied directly to the employee involvement/suggestion program.

Examples of very highly structured employee involvement programs with compensation include Gainsharing, Improshare, Rucker, and dozens of Scanlon-type variants. The principle is that incremental improvements in unit operation profitability and/or corporate profitability are directly shared with employees. These programs, around since the 1930's, have been implemented with mixed success. Popularity peaked in the 1970's and early 1980's. Profit sharing plans with more management control and flexibility appear to be more the norm these days.

Program selection must be based on a clear analysis of needs, corporate culture, and the business environment.

6.1. Financial considerations

A recent study of employee involvement programs in the United States [18] shows that the financial impact evidence is equivocal. These programs have a neutral impact on productivity (cost) but they do have a favorable impact on worker well being.

On a more positive note, a study [19] of compensated suggestion programs in the United Kingdom indicates a return on investment of about 4 to 1. The Employee Involvement Association (www.eianet.org) reported that 208 surveyed companies saved \$1.3 billion in 1995. The 1989 reported savings were \$2 billion. The numbers are significant in either case but it is not clear why the reported savings decreased.

6.2. Non-financial considerations

Employee involvement is an absolutely critical element of total quality management (TQM) and similar quality programs. The relationship of a suggestion program or employee involvement program to a quality initiative must be carefully balanced to avoid monetizing quality participation.

Studies suggest that employee participation is associated with positive affect, job performance, and reduced turnover.

Goal setting is critical according to one study. Cooperative goals contributed to constructive discussion among employees that resulted in productive work and stronger relationships, which in turn led employees to be committed to reducing costs. On the other hand competitive goals were negatively correlated with dynamics and outcomes.[20]

It is hard to sustain enthusiasm and this is especially true for highly promoted (hyped) programs. The message becomes harder and harder to deliver and interest wanes. Programs and companies that build recognition for contribution into their systems and culture appear to do better in the long run. Flexibility built into programs allows them to be refreshed periodically to keep them vital.

6.3. Summary

[Suggestion programs can play a productive role in organizations. Just don't expect them to turn the company around.](#)

There are so many flavors of suggestion programs that they are almost too easy to get into and too easy to get out of. This makes them open to failure when preparation is inadequate or expectations are inordinate. Like any management initiative, it is wise to plan well and avoid the appearance of fickleness or indecision. Employee involvement in general is a desirable thing and should be encouraged in a variety of ways.

7. Cost Reduction Projects

Cost reduction projects are defined by two factors: 1) They are focused primarily on the expense part of the profit equation and 2) They end when the project is done as defined by a date and/or profit objective. Their scope may be corporate-wide or limited to a specific piece of the business or business process.

Appendix B categorizes a host of methods that you may have heard of or may be using. Take a moment to look at them. Consider what you are already doing and how they interrelate with the profit equation in your company. They represent a tool kit that you can choose from as appropriate.

[Unfortunately it is not uncommon for costs to increase after a cost reduction project ends.](#) They may even exceed the pre-project levels. It does little good to make the year look good at the expense of those that follow. It is critical to select, engage in, and evaluate projects with the future in mind.

[Cutting too deeply can seriously backfire.](#) Telecommunications growth was 40% in 2000 and is estimated to be minus 15% in 2001 and no return to profitability until well after 2003. Companies such as Nortel Networks Corp. and Oplink Communication are forecasting losses this year and Corning and Lucent Technologies Inc. are experiencing significant reductions in profitability. Bad forecasting is said to be a large part of the

problem. "At the same time, many telecom companies had fewer experts available to forecast demand. ...equipment makers and telecom carriers *let go half of their forecasting employees over the last five years, chiefly for cost-cutting reasons* (emphasis added)." [21]

A book by Fifer promising to double profits in six months enjoyed some popularity for a while with recommendations such as "don't be afraid to use a shotgun," cut first and ask questions later," and eliminate all non-strategic expenses [22]. He has some good ideas but, in the author's experience, when they are exercised without a careful analysis of the medium and long-term impact the company can be sacrificing its future for a better quarter today. Research, business development, and critical business activities can fall under the ax when, at most, they might need some profit improvement. Remember what a shotgun does.

One company we know was so intent on cutting costs that they chose to ignore the benefits of increasing revenue. They eventually cut themselves down to a fraction of their former size – and profitability.

7.1. Financial considerations

Cost reduction projects can be quickly brought to bear on targets using methods such as those listed in Appendix B. Their finite scope and focus generally limits the associated cost. *The downside of this narrow focus on expenses is that the profit contribution will be correspondingly limited as well.*

Companies routinely report significant savings from cost reduction projects. There is no doubt that some of these are real and sustainable and some are not. Project selection is and important consideration.

Your financial staff should be involved in project selection and analysis. It is all too easy to rob Peter to pay Paul or to exaggerate the beneficial financial impact intentionally or unintentionally. Common mistakes include assuming overhead costs as being fully variable or missing offsetting expenses. One company "saved" so much money by repairing steam leaks that the calculations showed the steam lines to be a profit center rather than an expense. That was quite a fiction but management were happy with the numbers.

7.2. Non-financial considerations

One of the top issues with cost reduction projects is that a cut in one area often has consequences in others. It is easy to have a shifting of cost from one department or cost category to another. This can create conflict. Customer service, for example, may make a reduction in headcount to cut costs but the work gets shifted to sales or logistics with a

corresponding increase in workload there. Profits may go down rather than up as service suffers.

Methods vary all over the map in terms of their structure and rigor. A common approach short-term, for example, is to periodically limit travel expenses by establishing new criteria for who can travel and/or limiting the grade of airline ticket or class of hotel. Another approach is to cut X% from select budget categories. These are usually implemented by memorandum instructions. This type of approach requires very little structure. A downside is that the initiative may not be received well by the people whose quality of work life is affected.

A project approach can lead those who are not involved to believe that profit improvement is someone else's problem. And at the very least most people are not engaged in the process and are not contributing. This can lead to resentment. It's tough to keep a good attitude about sacrifices in your area of responsibility when others are still living the high life on expense reports.

Ease of implementation does not necessarily correspond to ease of acceptance. If you want to hear people complain, take away their high-priced meals, their business class tickets, or their five-star hotels. If you really want to create a stir, take these away from everyone except the "big guys." The resulting uproar will try to convince you that no work is possible on the road unless everyone travels in the lap of luxury. Work may suffer for a while until people realize they can survive until the ban is lifted. If your company had an ongoing profit improvement process, your expenses wouldn't have been out of line in the first place and any temporary special adjustment would have been more readily accepted. This illustrates one of the differences between the project and process approach.

It should come as no surprise that the cutting mentality often clashes with the idea of building a business. Better thinking recognizes the need to balance the profit equation.

7.2.1. Comments on purchasing cost reduction

No discussion of cost reduction would be complete without a review of purchasing cost reduction. It ranks near the top along with layoffs as one of the most popular methods for improving profits. It may be done as a project (one time) or process (ongoing). Any effort to improve profits should include an examination of purchased materials and services.

Purchasing cost reduction is a method of demanding lower costs from your suppliers. This focus on the expense side of the profit equation can have quick and significant impact on profit. In some cases the approach is dictatorial ("Do it or else.") and in others it is supportive ("Here are methods for reducing your costs. Let's work together."). Some approaches use a combination. Programs are generally run internally by trained purchasing professionals as leaders of a cross-functional team.

Supplier consolidation is a variation on the theme involving the reduction in the number of suppliers. Purchases are concentrated with the best (e.g. highest quality, most capable, and/or lowest cost) suppliers to leverage purchasing volumes and reduce the cost associated with managing a larger number of suppliers.

Purchasing cost reduction is especially critical to companies like automakers that rely to a great extent on purchased materials and services and can make only so much improvement internally. “Chrysler's ongoing cost-reduction programs look to reduce costs by 15% by the end of 2002; two-step program directs suppliers to cut prices charged in 2001 for materials and services by 5% and to work with purchasing teams to eliminate another 10% in costs in 2001-2002.”[23]

This “supply chain or value chain management” is truly a battle of survival of the fittest for suppliers; particularly those in the automotive business. For example, “The value chain is becoming a noose. In an industry that once numbered some 50,000 suppliers, today there are fewer than 30,000. [24]” This number is expected to shrink dramatically in the next 10 years.

A strong caution is that purchasing initiatives cannot be left to purchasing alone. They must have a holistic approach undertaken in concert with users of the goods and services. The lowest cost supplier or material may, in the end, cost far more than the potential savings if it results in quality or performance problems. Further, the problem/opportunity may not lie in the cost of the goods or service but in the fact that a better alternative exists. It generally takes a cooperative effort internally and with suppliers to find these alternatives.

7.3. Summary

The finite scope of the cost reduction project approach has its place as a beneficial approach. It should not be considered to necessarily have the long-term benefits offered by process (continuous) approaches.

8. Cost Reduction Process

Cost reduction processes are defined by two factors: 1) They are focused primarily on the expense part of the equation and 2) They are continuous year to year with long term objectives. Their scope may be corporate-wide or limited to a specific piece of the business or business process but are more generally corporate-wide.

A cost reduction process will incorporate the following six steps in a continuous improvement mode:

1. Set new goals
2. Create options
3. Evaluate options

4. Implement
5. Measure v. goals
6. Continue process

A reporting structure keeps the process on track.

8.1. *Financial considerations*

Cost reduction processes generally are low cost to install and relatively quick to pay off when targets are well chosen. The other side of the coin is that the expense focus can be quite limiting to the ultimate profit impact.

It is very difficult to cut your way to long-term prosperity. The same caveats of the project approach generally apply here as well.

8.2. *Non-financial considerations*

The continuous nature of the process is a positive driving force to keep everyone involved focused on the need to manage the expense side of the equation. People can become more cost conscious and make better decisions.

Almost any tool can be used under the umbrella of a cost reduction process. It is, unlike more highly structured methods, quite open to adaptation.

The low up-front cost (money and personal investment) leads to flexibility. These processes can be easily adjusted to changing conditions and needs without making management look like they don't know what they're doing.

As in any expense focused method, it is important to avoid a “cutting environment/mentality” that doesn't balance with sales and growth objectives.

8.3. *Summary*

The narrow focus on expense can lead to conflicts with quality and/or revenue. It is easy, for example, to reduce costs by reducing the training budget. The ultimate profit implications, however, may be negative and severe.

Cost reduction processes have relatively good payoff ratios and can be adjusted as necessary as the company evolves.

9. TQM - Total Quality Management and other quality based approaches

The quality movement in the U.S. is possibly the single most important business management initiative that has been undertaken in the last quarter of the 20th century. There is little doubt that without it substantially more of the country's economic might would have been exported to Europe and the Far East. One only has to observe the huge negative impact of the Ford/Firestone rollover/tire problem of 2000/2001 to understand how critical quality is.

Total Quality Management (TQM) and its various incarnations (see Appendix B) became an almost messianic focus particularly for the decade spanning the early 1980's through the early 1990's. The rallying cry of "Do it right the first time." was heard far and wide. The U.S. and the rest of the world began to wake up to the fact that the Japanese had learned the quality lessons of pioneers such as Edward Demming and J. M. Juran [25] long before and were dominating more and more markets with their high quality, low cost and innovative products.

Twenty-nine years after Juran's handbook, Philip Crosby's book *Quality is Free* became a best seller as Americans began to wake up to the costs associated with poor quality (loss) [26]. These costs they found included such things as manufacturing rejects, quality control staffing, warranty costs, lost customers, accelerated obsolescence and lost markets due to cost and quality issues. It was a real shock to find out that perhaps 30% of their costs in even highly respected companies were quality (loss) related.

TQM took off like a rocket and it wasn't until the early 1990's that the tales of woe were beginning to filter through those of success. The bloom was off the rose and the declarations of "management fad" were now being made. The bad news is that failure rates of 60-67% have been reported [27]. Even winners of the prestigious Malcolm Baldrige National Quality Award have even gone bankrupt. A recent journal article [28] reports that a survey conducted by Arthur D. Little of 500 manufacturing and service companies found that approximately one-third felt the TQM program was having a "significant impact" on their competitiveness. Surprisingly, the remaining two-thirds felt that the TQM programs were not impacting their organization positively. Also, a study conducted by A. T. Kearney of 100 British organizations revealed that only one-fifth felt positive results occurred as a result of the TQM program.

According to Stevens [29], "Many companies have experienced the reality that simply having a total quality (TQ) program does not guarantee business success." Several failures are cited by Mathews and Karel including Douglas Aircraft (a subsidiary of McDonnell Douglas Corporation), Florida Power and Light, and Wallace Co. Other failures found in the literature include Bell Helicopter Textron, Modicon, and British Telecom. Wallace declared chapter 11 bankruptcy one year after winning and the others had negative outcomes.

The good news is that the principles of managing loss by controlling quality do live on in various forms. There is now doubt that highly visible programs such as the Ford "Quality is Job One" initiative and those of the other automakers such as GM, Chrysler, and Saturn have been highly instrumental in their competitive response to Japanese

automotive imports. Quality is an evolving proposition for the automakers as they are continuously adapting their QS systems and standards. Even companies that don't have a TQM program per se are now using some of the tools of quality such as statistical process control (SPC). Quality is insinuating itself into the corporate fabric through its tools if not its programs.

9.1. Financial considerations

The installation of a quality program is relatively expensive. It is often not enough just to train existing personnel. Experts must be hired to lead and teach the precepts and tools to others. Consultants can be used to conduct initial training and provide structure but that must quickly be taken over internally. International Standards Organization (ISO) quality system certification audit fees start at about \$60,000 for a small facility.

A program might pay for itself within a year if there are adequate low-hanging fruit. One key is to focus on those areas where the quality is worst and the benefits are the greatest.

As a practical matter, in more and more industries particularly in manufacturing, a quality program is a minimum requirement for doing business. You can't even be a tier 1 or 2 automotive supplier in the U.S. today unless you comply with the automotive QS systems. Many international customers demand ISO certification as a ticket into the market.

It takes more than a TQM program, ISO or QS certification to make a positive impact on profit. Corporate goals must direct the focus toward profit improvement while quality is a means to that end.

9.2. Non-financial considerations

Most people do not understand how weighty a decision it is to fully adopt the principles of quality. Quality initiatives cannot be undertaken in isolation and must be fully supported from the highest levels of the company. Quality is philosophically driven and the entire company must own and support that philosophy.

Support for any quality initiative will be sorely tested the first time a financial objective is put at risk by a decision to delay or modify revenue based on a decision to preserve quality. For example: A company (nameless to protect the guilty) was months into its quality initiative when a plant manager called headquarters to say that millions of dollars of a new product did not meet specifications and critical orders could not be shipped. The quality manual said that the product had to be quarantined for resolution but the end of the quarter was only days away. The VP of marketing made the decision to ship the product anyway and gambled that the customers wouldn't experience any problems. His bonus was at risk. He won that bet with the customers that time but the company lost in the long run. Word spread like wildfire throughout the company that

quality didn't really matter after all; that this was just another management fad. It took a year to recover the quality momentum in the company. The VP left not long after that incident. The plant manager subsequently refused to accept the next product from R&D until the process was proven to be capable of staying in specification. He was soon promoted.

Another company quickly recognized that, while it didn't have the time or money to install a TQM program, the quality principles were vital to manufacturing success. They selectively applied tools to manufacturing and reduced the cost of production so much while improving quality that they were able to enter entirely new markets and enjoy much higher profit margins. They beat the competition on both quality and price and became the undisputed leader in that business.

A quality focus demands that people be treated in a quality manner as well. The philosophy can have a broad reaching positive impact on corporate culture and quality of work life. On the other hand, a failed implementation can be very distractive with serious consequences.

9.3. Summary

The lesson of the high failure rate of TQM is that there is no miracle cure but quality is an essential part of survival. Quality and TQM eventually exposed themselves to that reality and management pulled back. Now managers are looking deeper to find what works and how to modify it to their circumstance. The more rational approach is yielding more satisfactory results. According to Shin [27] the lessons learned from TQM successes and failures include the following:

1. Know thyself. Make sure you know what the implications of TQM are before you set out.
2. Create a conducive and supportive culture. Cultural readiness to accept the precepts and principles is critical.
3. Align implementation with the corporate strategic priorities, competitive environment, and goals.
4. Understand how much time, effort, and money it will take.
5. Adapt the concepts to your unique circumstance.
6. Take a 'holistic' approach to engage the entire company.
7. Recognize that TQM is a means to an end rather than an end in itself.

These are good lessons for any pan-corporate change effort. Quality is a part of the answer and not the whole. In the profit equation, profit lies at the confluence of revenue, expense, and loss.

One warning on TQM implementation says, "...TQM appeals to faddism, egotism, and quick-fixism. Accordingly, it is nothing more than a "technique" managers feel they must use because it has been adopted in one form or another in a significant number of

other organizations. [28]” It is wise to keep this in mind when selecting any method (e.g. Six Sigma). Popularity can be very deceiving.

The next generation of the TQM movement appears is the Six Sigma program that Motorola developed in the early 1990’s out of its quality initiatives.

10. Lean

Lean or lean manufacturing as it was initially known actually takes its roots back in the early 1900’s when Henry Ford created the first manufacturing production line. Ford realized that the elimination of wasted time, motion, complexity, variation and material would allow him to produce automobiles at a lower cost.

The current generation of Lean, derived considerably from the Toyota Production System (TPS), is in essence a management philosophy focusing on reduction of the seven wastes (over-production, waiting time, transportation, processing, inventory, motion and scrap) in manufactured products while maximizing the value to the customer. The intent is that by eliminating these wastes, quality is improved, and production time and cost are reduced.

“Principles of Lean: The five-step thought process for guiding the implementation of lean techniques is easy to remember, but not always easy to achieve:

1. Specify value from the standpoint of the end customer by product family.
2. Identify all the steps in the value stream for each product family, eliminating whenever possible those steps that do not create value.
3. Make the value-creating steps occur in tight sequence so the product will flow smoothly toward the customer.
4. As flow is introduced, let customers pull value from the next upstream activity.
5. As value is specified, value streams are identified, wasted steps are removed, and flow and pull are introduced, begin the process again and continue it until a state of perfection is reached in which perfect value is created with no waste.” [30]

The ultimate expression of Lean is in a Toyota automobile assembly plan where parts and materials arrive just in time to be assembled in a continuous flow through the plant to meet customer demand. Both Lean and TPS can be seen as a loosely connected set of potentially competing principles whose goal is cost reduction by the elimination of waste. [31] Speed of production is a primary consideration of both Lean and TPS.

Widely applied tools of Lean include but are not limited to the following:

Tool	Use
Value Stream Mapping	Identify waste in a process
5S	Clean and organize a work area
Target Costing	Set cost goals for production
Setup Reduction	Take time out of production/process changeovers
Poke Yoke	Preventing errors in processes
Kan Ban	Material in process management

10.1. Financial considerations

A full Lean transformation takes years and large amounts of money. On the other hand, the incremental application of tools can be readily accomplished with an eye toward the return on investment.

Some Lean consultants propose that the object is to achieve Lean implementation and financial considerations such as ROI and profits should be secondary. It is important for management to establish clear parameters for project evaluation and approval to avoid over-investing.

An underlying principle in the TPS is something akin to “build it and the results will arrive.” Toyota believes that if you organize and operate in a Lean fashion the company will produce a quality product at a profit with an acceptable market pricing. Toyota continuously reduces the standard costs of its production elements with the expectation that solutions will be found to meet those lower costs.

10.2. Non-financial considerations

A primary challenge with Lean is that there has been a rush to apply the philosophy and tools to manufacturing operations that are not suited to one-stream-of-production, to non-manufacturing business and the full range of support functions without adequate regard to ultimate suitability.

The Lean Enterprise Institute tells us that “It is not a tactic or a cost reduction program, but a way of thinking and acting for an entire organization. ... lean is not a program or short term cost reduction program, but the way the company operates. The word transformation or lean transformation is often used to characterize a company moving from an old way of thinking to lean thinking. It requires a complete transformation on how a company conducts business. This takes a long-term perspective and perseverance.” [32]

When applied in an all-or-nothing approach, “nothing” all too often wins. This short-sighted view leads to misapplication and disappointments. The indicated success rate is somewhere between 5 and 20% [33].

10.3. Summary

“A lean organization understands customer value and focuses its key processes to continuously increase it. The ultimate goal is to provide perfect value to the customer through a perfect value creation process that has zero waste.” [32]

The tools of lean can be well applied in many situations and organizations to achieve great results independent of a “transformational shift.” They should be considered as part of any good continuous improvement tool kit.

The value stream mapping tool which is central to Lean has been widely and very successfully applied in many situations from manufacturing to services to remove waste and to improve the customer experience. At the same time, there is criticism that overuse and misapplication have led to significant problems. In a private conversation in 2010 a company president told me that he wanted no part of a Lean program because he had just watched one of his competitors “Lean themselves to death.” The cutting of materials and resources throughout their value stream had left them unable to compete.

There is no question that some good managers are giving up support for Lean and Six Sigma programs when they are asked to make significant decisions about large investments in training, infrastructure, equipment, software and other changes based on an ill-defined financial return on investment. This makes abandoned and curtailed programs appear to be failures or faddish when the reality is that it is the measures were wrong, the projects poorly selected, the applications not financially justified or for some other good management reason.

A lesson is that the blind application of any process or tool can lead to situations that mandate a need to change the approach. Yes, it is imperative that managers support the programs but it is just as imperative that the programs support management in its drive to meet corporate objectives.

11. Six Sigma /Six Sigma Lean

Six Sigma is an outgrowth and extension of the quality movement developed by Motorola and adopted by some high-profile companies such as General Electric (GE). The term six sigma itself is an expression of statistical probability that a process under that level of control should produce no more than 3.4 errors per million (see note in box following). In essence, Six Sigma is a business improvement process that utilizes structure and statistical tools to analyze problems for potential solutions, finds the best solutions, and makes changes to achieve essentially error-free operations. The net results should be higher quality and lower costs.

The tools of Six Sigma are well suited for manufacturing quality improvement (the loss part of the profit equation) but are said to have a potentially large impact on expense and revenue as well. GE points to market growth in its medical systems group as a result of Six Sigma efforts. Implementation is done by trained practitioners with certifications modeled on the martial arts belt ranking system: green belts, black belts, and master black belts with varying levels of training.

If we distill programs such as Six Sigma and Lean down to their dogmas, it is easy to see why they should not and cannot ever be applied to every single organization in pure form.

Six Sigma dogma: almost perfect quality must be attained and sustained in essentially everything that is done. The ultimate flaw is that such perfection is too costly to achieve in most circumstances. Six Sigma often loses its link to profitability.

Lean dogma: the flow of production through the process must be accomplished seamlessly and with no waste. The ultimate flaw is that most organizations do not run in lockstep like the automotive assembly factory for which this principle was perfected. Lean dogma often leads to costly changes that have no clear path to a return on the investment.

The overall process involves a number of steps (ten according to Motorola and five according to GE.) [34].

Motorola Version	GE Version
1. Prioritize opportunities for improvement	1. Define the problem
2. Select the appropriate team	2. Measure what you care about
3. Describe the total process	3. Analyze – statistically find root causes
4. Perform measurement system analysis	4. Improve – mobilize change initiatives
5. Identify & describe the potential critical process/product	5. Control – sustain improvements
6. Isolate and verify the critical processes	
7. Perform process and measurement system capability studies	
8. Implement optimum operating conditions and control methodology	
9. Monitor processes over time/continuous improvement	
10. Reduce common cause variation toward achieving six sigma	

NOTE: [35]

Six Sigma: The traditional quality paradigm defined a process as capable if the process's natural spread, plus and minus three sigma (three standard deviation), was less than the engineering tolerance. Under the assumption of normality, this translates to a process yield of 99.73 percent. A later refinement considered the process location as well as its spread (Cpk) and tightened the minimum acceptable so that the process was at least four sigma from the nearest engineering requirement. Motorola's Six Sigma asks that processes operate such that the nearest engineering requirement is at least plus or minus six sigma from the process mean.

Motorola's Six Sigma program also applies to attribute data. This is accomplished by converting the Six Sigma requirement to equivalent conformance levels.

One of Motorola's most significant contributions was to change the discussion of quality from one where quality levels were measured in percentages (parts per hundred) to a discussion of parts per million or even parts per billion. Motorola correctly pointed out that modern technology was so complex that old ideas about acceptable quality levels were no longer acceptable.

One puzzling aspect of the "official" Six Sigma literature is that it states that a process operating at Six Sigma levels will produce 3.4 parts-per-million nonconformances. However, if a normal distribution table is consulted (very few go out to six sigma), one finds that the expected nonconformances are 0.002 parts per million (two parts per billion). The difference occurs because Motorola presumes that the process mean can drift 1.5 sigma in either direction. The area of a normal distribution beyond 4.5 sigma from the mean is indeed 3.4 parts per million. Because control charts will easily detect any process shift of this magnitude in a single sample, the 3.4 parts per million represents a very conservative upper bound on the nonconformance rate.

Six Sigma is a very highly structured process that demands the following for success:

- Absolute top to bottom management commitment to the Six Sigma philosophy and process – you cannot be a little bit pregnant with Six Sigma
- Financial commitment to follow through for the long term
- Intense training. A minimum of two weeks and some say six weeks of classroom training plus on-the-job assignments for at least one year. You will need a corporate training center and/or committed training consultants
- Full time assignment of participants to Six Sigma projects
- Make sure subject matter experts are on the teams
- Use global criteria to select projects
- Focus on the customer
- Include finance and accounting in the process to ensure the proper selection and measurement of projects
- Train enough people to get the job done – GE has 4,500 black belts and 800 master black belts

In the mid to late 1990's, as the limits and deficiencies of Six Sigma became more apparent, a concerted effort was made to incorporate the techniques of Lean Manufacturing and elements of the Toyota Manufacturing System. Many of the commercial training programs are now defined more broadly as Six Sigma Lean rather than must Six Sigma. This is a nod to the fact that statistics alone cannot adequately act alone as change agents for complex manufacturing operations involving hundreds or thousands of people. Further, "soft processes" such as business operations processes may be difficult to cost-effectively measure and manage on a statistical basis.

11.1. Financial considerations

[Open your checkbook for Six Sigma.](#) The startup costs are significant. Expect to pay out a quarter million dollars to hundreds of millions of dollars depending on the size of your company [36]. One rule of thumb is that you will spend the equivalent of a year's salary for each trainee (black belt). They must then be devoted full time to Six Sigma projects. The upside is that each black belt is expected to save about \$150,000 per project twice a year. Others say that the expectation is \$1 million per black belt per year. It's so difficult and expensive to train the experts that poaching and turnover have become a problem [36].

[The selection of projects and the accurate measurement of savings is a significant challenge common to most cost reduction programs and Six Sigma is most certainly not immune](#) [37]. This article points to an example where the elimination of a report cost \$200,000 per year in lost interest on overnight money and another where a change in the tax reporting process exposed the company to IRS penalties of \$3,500,000. Ronald Snee says that project selection is the Achilles' heel of Six Sigma and if projects are not selected properly the entire initiative can be at risk [38].

With so much invested, there is a tendency to overestimate the financial benefits of projects. Financial reviews and audits are important for maintaining accuracy and program integrity.

11.2. Non-financial considerations

[Most Six Sigma experts say that it is an all-or-nothing venture and point to shortcuts and partial installation as a root cause of program failure](#) [39].

The statistical methods have been clearly demonstrated for decades to be of use in many manufacturing environments. In addition, many practitioners claim that it is effective in support areas (e.g. development, engineering, quality, personnel, sales, marketing, and field services). That claim, unfortunately, is not well demonstrated in Motorola's training materials and good examples are hard to find [40].

[Structure and accountability can help get things done in spite of management.](#) I spoke with a Dupont engineer in May 2001 about his experience as a black belt. He said it was frustrating at times but he and his team did get management to approve a major change in the power plant at his manufacturing plant. They finally agreed to shut down one of three steam boilers to save about a million dollars a year. Management had resisted until the team brought together a data analysis and put the spotlight on the decision. Before Six Sigma the safe management decision was to maintain the status quo. After Six Sigma the status quo became more risky. That's part of the GE Workout philosophy Jack Welch applied so successfully.

The global scope of and demand for personal commitment to Six Sigma makes it absolutely critical that implementation be undertaken with no shortcuts. A failure can disaffect employees and seriously distract them from getting the work done. A success can bring them together for the betterment of the individuals and the company. Some 57% of people surveyed say that their Six Sigma initiative has had a neutral to negative impact on job satisfaction [36].

11.3. Summary

It is tempting to be seduced by the apparent success stories in the press and rush to adopt Six Sigma. That good press hides the rest of the story.

[The debate rages over Six Sigma](#) [41] as the founder, Motorola, is performing poorly through the first half of 2003 as measured by stock valuation. As Harrington past president and chairman of the board of both the American Society for Quality and the International Academy for Quality, [40] says, “The company that invented and used Six Sigma for the longest period of time has continuously decreased market share and lost technological leadership.” Smith and Oliver [42] are quite concerned when they say, “Several companies have adopted a defect reduction program developed by Motorola Inc. called Six Sigma, with the goal of trimming defects to fewer than 3.4 parts per million. This unrealistic goal, however, may serve more as a marketing tool than as a quality program. Six Sigma is based on several arbitrary assumptions. The reality is that a totally whimsical defect rate was selected and a dubious scientific framework constructed to give the appearance of substance. Unfortunately, most people are easy prey for this type of misrepresentation.” A 2005 survey of 156 companies indicates that fewer than 40% are attempting to employ Six Sigma[43].

Six Sigma proponents point to the stellar success of General Electric under Jack Welch as the example for emulation. The reality is, however, that [Six Sigma is only one part of a highly complex management approach that Welch engineered over a long period of time](#). There are a number of good books about GE and “Control Your Destiny or Someone Else Will” is required reading if you are interested in following in his shoes [44].

[Kevin McManus, a senior examiner for the Malcolm Baldrige National Quality Award, is concerned that we are currently riding the wave of another fad](#) [45]. He points out that a noted Six Sigma consultant recently acknowledged that the concepts of Six Sigma have been around for years (something like 70). [The consultant also said, however, that the concepts need to re-titled and re-packaged every three years or so in order to sell books and seminar seats](#). McManus goes on to say, “[There is mass confusion in the business world as a result of this practice](#). There must be at least 50 different approaches to problem-solving and total quality management out there, with each proponent touting the benefits of his or her approach over the others. These different approaches are really the same if you look at them closely Six Sigma is merely total quality management done right: an improvement effort that is supported with the proper

amount of project development resources and focused on areas that will provide the greatest return. The variety of titles and takes on TQM are essentially the works of Deming, Juran, and Shewart re-packaged, re-titled, and revisited. Still, instead of seeking more effective approaches to applying these concepts, we look for the next fad.”

Do yourself a very big favor and read the book “Implementing Six Sigma: Smarter Solutions Using Statistical Methods” by Louis W. Breyfogle III [34] *before you buy the sales pitch from the many Six Sigma consultants in the field.* It could save you a fortune. There are places where it will work and where it won’t no matter what they tell you. After you read the book, you will be in a better position to make decisions about the program.

In 2011 it is becoming more and more clear that statistics alone cannot sustain the dramatic changes required for effective and sustainable cost reduction. Conversations (S. Martin 2008) with lead representatives for the latest change initiative for a Global 100 manufacturing company indicate that history showed them that a large percentage of the gains made under their Six Sigma initiative were, in fact, unsustainable over time. They are now trying to regain what they have lost by incorporating Lean Manufacturing principles modeled after the Toyota Production System.

While there is absolutely no doubt that quality methods and tools such as those included in Six Sigma can work in the right situations, not all circumstances are appropriate or will deliver the expected results. David Fitzpatrick of Deloitte Consulting says, “...fewer than 10% of companies are doing it to the point where it’s going to significantly affect the balance sheet and the share price in any meaningful period of time.” [46] As of 2003 some 36% of users say Six Sigma has *not* significantly improved profitability [36].

As of this revision, the news is not good for cost reduction programs, Six sigma, Lean, combined Six Sigma / Lean and other forms of Continuous Improvement Programs. A past president of the Association for Manufacturing Excellence wrote in February, 2011 that “...less than 5% (in most practitioners’ opinions) of CI efforts produce sustainable, positive results for the organization.” [33] This is far worse than the 60 to 80% failure rate that has been consistently reported for the past half decade [47]. The status quo of a 5% success rate says that the current Continuous Improvement models are obsolete. *This is the time for the Profit Improvement Process and similar flexible profit-oriented programs for continuous improvement.*

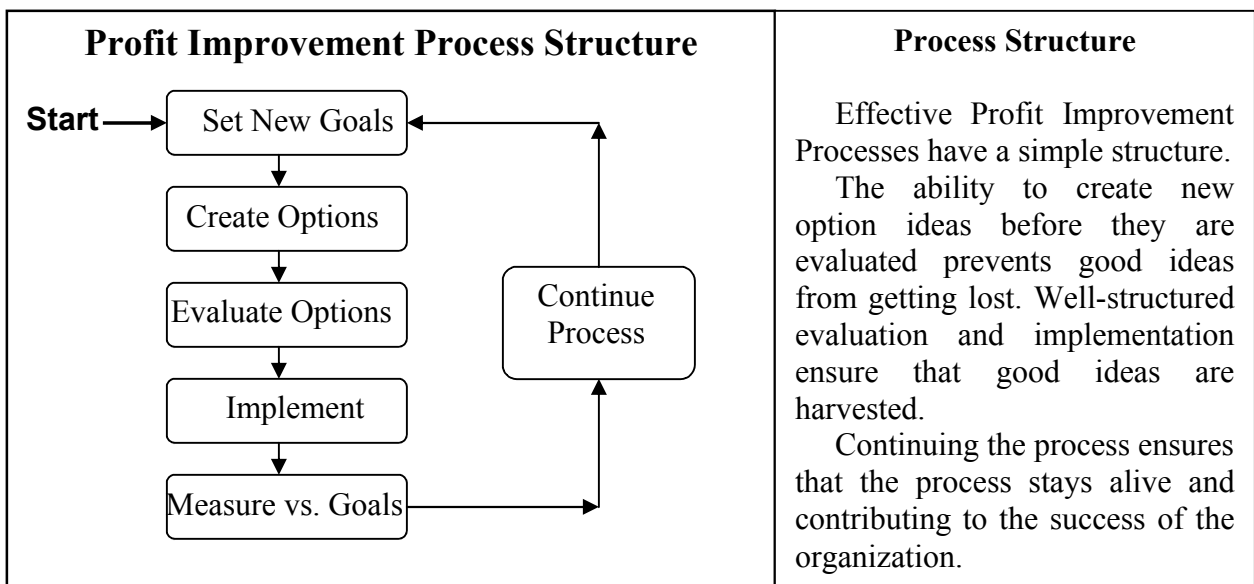
12. Profit Improvement Process – The balanced approach

A Profit Improvement Process (PIP) engages the collective intellectual capital of the company to identify and harvest opportunities for profit improvement in all three areas of the profit equation: expense, loss, and revenue. All employees are informed of the process and key employees are engaged in teams to enable change. Skill training

includes the most advanced creativity and innovation tools available today. The training, process structure (figure below), annual goals, and continuous reporting create an environment that is conducive to positive change. **Innovation and growth are encouraged and sustained for the future while addressing the critical issues of today.**

Figure 1 Profit Improvement Process Structure

A significant benefit of a PIP is the fact that all employees are aware of the **cost-benefit of their investments and the profitability of their sales decisions.** This focus on the profit equation keeps the company sharp and the employees in a learning mode. Employees learn that they are part of the profit solution rather than worrying constantly about what others are going to do to their jobs (i.e. layoffs and cutbacks).



Results are rapid and significant. In nine months one insurance company added over \$5 million of sustainable profits to the bottom line with a two-year return in excess of 100 fold on its initial program investment. The backlog of potential profit improvement projects was in excess of \$100 million after the first year. A \$20 million revenue manufacturing and distribution company generated \$1 million in profit improvement ideas in a few weeks. Within two years in a depressed market all of their profits could be attributed to the changes they made through profit improvement projects.

A key to success, in addition to engaging the intellectual capital of the entire company in a positive way, is the use of the profit equation to balance growth and cutting. **The price of forgetting the profit equation and not having a self-sustaining profit improvement process can be extreme.** A July 9, 2001 article on the front page of The Wall Street Journal [48] reports, “While the U.S. economy is showing tentative signs of stabilizing and could even stage a modest recovery by the winger, the corporate cost-cutting that started late last year could go on for quite some time.” The article also reports that Ron Nicole of the Boston Consulting Group, tracking the overhead costs of

America's 1,000 largest companies, found that many of them lost site of their revenue/cost ratios while building sales volume. He estimates that they are currently overspending by \$150 billion per year. An executive vice president of International Paper said that the company has taken its first comprehensive, company-wide look at overhead costs since 1985. They found layers of costs that it didn't need and opportunities for process improvement. They laid off 3% of their workforce in June and are 25 to 40% of the way done.

12.1. Financial considerations

The cost of using consultants to initiate a profit improvement process is *considerably less than that for massive programs such as TQM or Six Sigma*. Training for implementation is one to two days depending on the level of involvement planned for the trainee. Companies, depending on size and complexity) usually choose to use consultants to train the core 10% of their staff and then bootstrap from there using internal trainers and peer training.

Consulting and training fees are variable depending on company size. They range from about ten thousand dollars for a small company with less than a hundred employees (train a dozen or more staff) to over one hundred thousand dollars for a company with a few thousand employees (train hundreds of staff).

The cash flow payback is usually a matter of a few months at most. Long-term payback is as large as the profit goals allow.

12.2. Non-financial considerations

Like any change process, top management commitment is critical to success. It all starts at the top and it will end there if management is not clear in its support. While the process does help significantly in overcoming barriers to change, hypocrisy or inconsistency from the executive suite can kill potential faster than a speeding bullet.

Even in this age of "employee empowerment" managers are often loath to cede any influence to the employees. Managers will find excuses not to train their people in profit improvement methods because they fear that they will lose control. They fear that some of their propensities and delinquencies will be exposed. They're right. *It takes motivation and confidence in the executive suite to engage in a Profit Improvement Process.*

The Profit Improvement Process requires the following for success:

- Management support and commitment
- Adequate systemization as provided by the process
- Consistent reporting as provided by the process
- Delegation of authority to control expenses by people charged with responsibility

- Accountability for program compliance
- Use of appropriate project selection criteria as determined through the process
- Accommodation for change and growth
- A plan for the inevitable cycles of enthusiasm
- Use the change methods inherent to the process
- Focus on real profit changes not phony money
- Adequate training and communication as provided by the process

12.3. Summary

Any change process requires structure in order to run but it must also incorporate adequate flexibility to deal with the changes required over time by the interaction of that process with the real world. As General George Patton once remarked, “No plan survives contact with the enemy.”

There is no such thing as a perfect process or a perfect plan. The only way one can even hope to come close to perfection is to build in measures for reassessment and adjustment. This is the opportunity of the Profit Improvement Process.

The Profit Improvement Process (PIP) is an example of a model that attempts to embody the best of what has been used over the last century while avoiding the pitfalls. PIP is a synthesis of good business practice and the powerful tools of creativity and innovation methods embodied in Creative Problem Solving. This combination **taps the intellectual capital of your employees to enable positive change**. Profits flow from there. PIP incorporates change methods that help create the readiness for change that is critical to success [49].

Companies can undertake these initiatives on their own or they may engage expert consultants to get them started with the right structure, methods, and training to accelerate and maximize positive results. The essence of the process is embodied in the models and tools that are summarized in the book “Creative Approaches for Developing a Cost-Effective Organization” [50]. Companies that want to accelerate the process and maximize profit impact engage experts to get them started.

The flexibility of PIP allows the use of any of the tools associated with six-sigma and other quality programs without having to embrace the entire concept. Almost any productive tool or method is appropriate to the PIP continuous improvement model.

13. The obstacles to change

Change demands the willful violation of some of the principles that corporations hold dear. This is risky. Any major change represents an assault on the cultural fabric

within a company. Change, no matter how beneficial it might be, will be met by some degree of fear and resistance [51].

Cost reduction and profit improvement initiatives are all change initiatives. You are trying to change systems, methods, approaches, and ultimately the thinking of your people.

It is imperative for success, therefore, that any change such as the introduction of a Cost Reduction or Profit Improvement Process be done in such a way as to palliate that fear and overcome the resistance in a positive manner.

Most corporate cultures and reward systems reward employees for maintaining the status quo. Without consistency anarchy could disrupt the commerce. This drive to the status quo, however, also serves to maintain the bad as well as the good. Inefficiency is maintained because it is the standard.

It takes more than intellect and traditional management skills to overcome resistance to change [52]. The cost reduction or profit improvement methods that you choose must incorporate change methods in order for them to succeed.

Martin's Four Rules of Change

1. First you must understand the existing rules
2. Then you must break those rules
3. Then you must create new rules
4. And finally you must follow them

“Fail at any one of the four rules of change and you will remain where you are.”
Steven C. Martin

14. How to succeed

The following steps are useful for starting a selection process for creating a new initiative or establishing a new one:

1. Evaluate the need for change. What does your desired future (profits, employee involvement, market share, return on investment, etc.) look like compared to the present? Is there a significant difference?
2. Determine if top management adequately motivated to commit their backing and resources to change.

Four Steps to Implementation

1. Diagnosis
2. Adaption
3. Design
4. Adoption

3. Set initial objectives.
4. Decide what your initiative should look like to achieve your objectives.
5. Examine the alternative approaches detailed in this white paper. Consider which ones have the best fit with your organization in terms of: See Appendix A for a tabular summary.
 - a. The culture (e.g. employee empowerment, independence, structure, morale, learning organization, etc.)
 - b. The organization (e.g. hierarchical, distributed control, etc.)
 - c. The need for speed
 - d. How radical the implied changes might be
 - e. Readiness for change
 - f. Resource availability
6. Create a short list of potential initiatives and consult with experts who are familiar with the various initiatives. Get cost estimates from them.
7. Evaluate the initiatives against your goals. Weigh their cost, resource requirements and probability of meeting the goals.
8. Consider a trial initiative in a single business unit. This can be a low-cost, low-risk means of fine-tuning your initiative. This is highly recommended.
9. Assign leadership and give them the targets, budget, and authority to implement.

Here are 13 questions to consider in regards to cost reduction or profit improvement initiatives: They should be asked and answered for your organization, as the answers are dependent upon the exact nature of your organization and your needs.

1. How to maximize the potential for the program?
2. How to overcome the natural human resistance to change?
3. How to tailor the program for your organization?
4. How to identify opportunities?
5. How to train the appropriate personnel?
6. How to take action once the ideas are found?
7. How to keep score?
8. How to determine what counts as a profit improvement and why or why not?
9. How to ensure ownership of the program?
10. How to build it to last?
11. How to incorporate a PIP into other programs or vice versa?
12. How to identify and tap supporters and contributors while overcoming resistance?
13. How to provide recognition for success?

The initiative and its documentation should be as simple and straightforward as possible. Rules and examples should be clear and tailored for your specific organization. Be sure to provide reporting forms (paper and/or electronic) to everyone that needs them. Appoint a clerical person to assemble and report the progress on a regular basis. Nominate a program leader/coordinator who people will follow, train them well, then give them the tools and the authority and go to work. Set target and stretch goals for achievement. Don't be afraid to reach. Reward/recognize people for achieving their goals.

A good start with continuous management support and direction can provide profit improvements year after year.

15. Fads and good management

Management is often criticized for adopting the “flavor of the month” management fad or fashion [45] [53]. These fads may look good at the moment and result in promotions and individual success, but they do not always produce the desired positive results.

One recent study concludes, “Our results suggest that management fashions introduced in recent years have shorter life spans than their earlier counterparts. However, these contemporary fashions are broader-based and require substantially greater implementation efforts from management. Simultaneously, organizations appear to rather quickly abandon such difficult interventions [54].” In other words management are spending more money faster on initiatives that they abandon more quickly. No wonder profits are suffering.

This is not to say particular management fashions may not be well suited to your company. But it is to say “keeping up with the Joneses” is not the way to pick management processes for your company.

16. Summary

Profit initiatives are no substitute for good management but good managers learn how to use them and other tools wisely. The key is to act in a positive manner while allowing for change and innovation.

This paper has examined seven major categories and types of cost reduction and profit improvement initiatives (see Appendix A and B). They range from simple to complex, from inexpensive to expensive, from total management control to total employee involvement. They can all provide some benefit but they all carry some risk as well. There is no one-size-fits-all approach. Careful selection can give you an initiative that will work if you give it the commitment and support that it needs from the start.

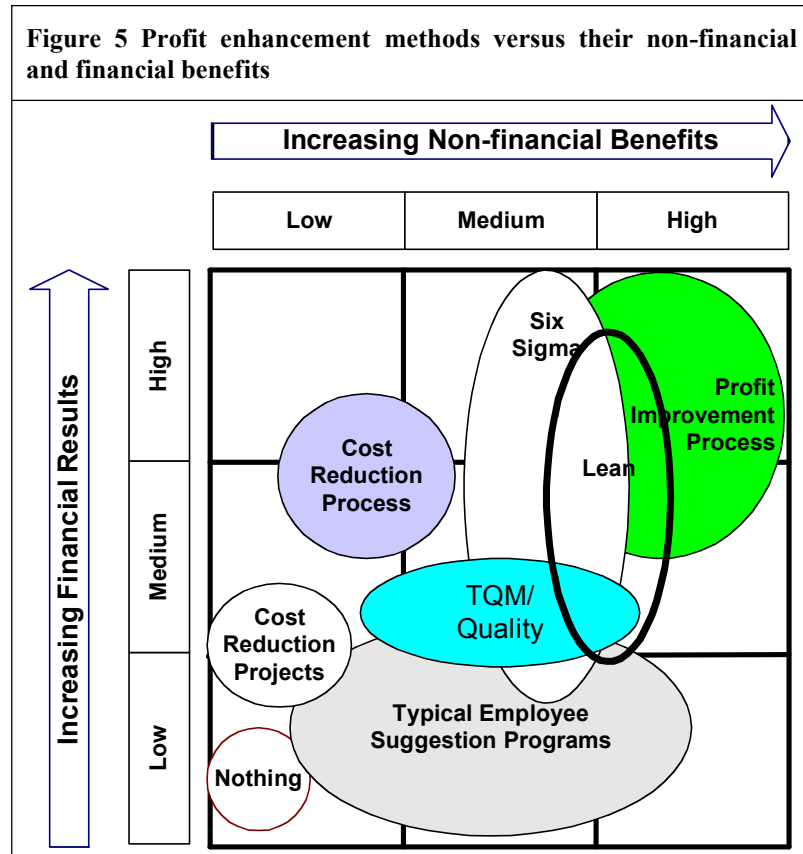


Figure 5 summarizes the relative financial and non-financial benefits of these seven categories. The more effective approaches over-all lie in the upper right quadrant.

Both your profit problems and your solutions lie at the core of your company within your people. The key to success is to engage them fully and positively with a well-designed and structured approach that engenders the support and enthusiasm of your people to build profitable growth.

Steven C. Martin
 President
 Business Solutions – The Positive Way

No company has ever cut its way to long-term success.

Author information

Steven C. Martin, President of Business Solutions – The Positive Way®, is a seasoned professional manager, consultant, patented inventor, cost reduction expert, and problem-solving expert. Fortune 500 and entrepreneurial businesses have used his proven turn-around and problem-solving skills. He is the only profit consultant in the world with an engineering degree, over 40 years of professional practical knowledge and extensive technical and business graduate studies, and a Master of Science degree in Creativity and Innovation. In 1999 he was the 136th person in the world to have been awarded this advanced degree in creativity by The International Center for Studies in Creativity – the only accredited advanced degree of its kind in the world.

[We have decades of professional success.](#) The estimated combined value of what we have individually contributed to employers and clients is in excess of \$100 million. Client savings generated using our methods such as the Profit Improvement Process go far beyond this. We have a proven track record of success with companies as large as 21,000 people and as small as start-ups. We use powerful systems and effective training to overcome barriers to success. [Our work more than pays for itself – always.](#)

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 - “Evaluate your Existing Cost Reduction and Profit Improvement Efforts: Are They World-Class?” – A 10-question quiz to see if your current initiatives are world-class
 - “The Five-minute Cost-Effective Organization Climate Quiz” – A 20-question quiz to test how your climate relates to those that produce world-class profit results.
- ❑ **The definitive book on profit improvement:** *Achieving World-Class Profit Improvement: Creative Approaches for Developing a Cost-Effective Organization: Proven Methods for Cost Reduction and Increased Profitability.* Available for purchase on the website.
- ❑

Books	Description
	<p><i>Achieving World-Class Profit Improvement</i></p> <ul style="list-style-type: none"> • <u>A must for any business that wants cost reduction, profit improvement; continuous improvement</u> • World-Class cost reduction and profit improvement methods that are proven to work • 23 tools and methods to improve profits • The framework and tools to create and supercharge a cost reduction and profit improvement program in your business today • The Creative Problem Solving model to help you make better decisions and implement change • What it takes to become a cost effective organization • How to move beyond the suggestion box to real success in cost reduction and profit improvement
	<p><i>Instant Profits: Making Your Business Pay</i></p> <ul style="list-style-type: none"> • <u>Over 250 business tools, tactics and methods to lead you to cost reduction, improved cash flow and increased profits</u> - equipment costs, resources, inventory, waste, taxes, health insurance, overhead, pricing, waste, and much more. • Methods for increasing or setting the right prices • Tips for cost reductions that are worth real money • Examples of how business have applied these methods • Tools you can start using today to create savings • 60 profit related business mistakes that many businesses make & how to avoid them • Much more to help you and your business succeed - make a difference quickly

These books are available in electronic format at a discount at www.ProfitPro.com with fast electronic delivery world-wide.

17. Appendix A. A tabular summary of profit enhancement methods.

Method	Relative Structure	Relative Cost to Install	Relative Profit Impact	Benefits	Concerns
Downsizing	Low	Med. – High	Negative – Low	<ul style="list-style-type: none"> ▪ A quick hit to expense 	<ul style="list-style-type: none"> ▪ Often does not achieve goals in long term ▪ Very expensive in terms of human / morale costs ▪ Can conflict with revenue and strategic goals
Cost Reduction Project	Low - Medium	Low - Medium	Low - Medium	<ul style="list-style-type: none"> ▪ Can be easy to target expense categories ▪ A quick hit to expense ▪ Finite scope and term - flexible 	<ul style="list-style-type: none"> ▪ May be a short-term or cyclical effort ▪ Can't cut a way to success ▪ Can conflict with revenue and strategic goals ▪ Limited scope
Cost Reduction Program	Medium	Low - Medium	Low - Medium	<ul style="list-style-type: none"> ▪ A near and longer term view of profits ▪ Can be installed incrementally ▪ Builds impact year to year 	<ul style="list-style-type: none"> ▪ Cannot cut your way to success ▪ Can conflict with revenue and strategic goals
Employee Suggestion Programs & Employee Involvement Programs	Low - High	Low - High	Low - Medium	<ul style="list-style-type: none"> ▪ Many variations on the theme are possible from suggestion boxes to Scanlon Plans (profit sharing/pay for performance) ▪ Can engage everyone ▪ Open to any idea or complaint ▪ Can expose organizational problems 	<ul style="list-style-type: none"> ▪ Results can be hard to measure ▪ Can lose focus ▪ May increase costs in some cases ▪ Allows credit for “savings” that are not real ▪ Monetarily incented plans can backfire – become a right rather than a reward ▪ Participation rates can be low ▪ Rejected ideas can lead to resentment

A tabular summary of profit enhancement methods continued.

Method	Relative Structure	Relative Cost to Install	Relative Profit Impact	Benefits	Concerns
TQM (Total Quality Management) and similar quality initiatives	High	High	Med. – High	<ul style="list-style-type: none"> ▪ Improved quality (a competitive level of quality is essential for survival) ▪ Incorporates many statistical tools ▪ Can be universal 	<ul style="list-style-type: none"> ▪ Focus primarily on quality (loss) ▪ Demands intense training & support over a long time ▪ Initiatives can fail to achieve goals – not a panacea
Lean	High	High	Med. – High	<ul style="list-style-type: none"> ▪ Improves speed of production & service ▪ Reduces waste ▪ Promotes quality ▪ May reduce costs 	<ul style="list-style-type: none"> ▪ Dogmatic ▪ Intensive training required ▪ May hurt growth ▪ Can reduce flexibility ▪ No direct revenue support
Six Sigma	High	High	Med. – High	<ul style="list-style-type: none"> ▪ Results focus ▪ Results are measured ▪ Incorporates many statistical tools ▪ Builds skills ▪ Builds impact year to year 	<ul style="list-style-type: none"> ▪ Demands intense training (two - six weeks or more) ▪ Requires full time assignments of practitioners ▪ Highly technical statistical tools ▪ Better suited for manufacturing ▪ Cumbersome for small projects ▪ Does not consider revenue ▪ May allow “savings” that are not real ▪ Expensive to install
Profit Improvement Process	Medium – High	Low - Medium	Med. – High	<ul style="list-style-type: none"> ▪ Results come quickly ▪ Results are measured and tracked ▪ Can be installed incrementally ▪ Engages people in a positive way ▪ Builds skills & profit-focus ▪ Any business type can benefit ▪ Builds revenue while reducing loss and cost – holistic approach ▪ Synchronizes with strategic plans ▪ Builds impact year to year ▪ Cost effective – High ROI 	<ul style="list-style-type: none"> ▪ Relies heavily on the skills and talents of the people ▪ Additional tools require additional training ▪ Requires management support ▪ Requires some training (1 – 2 days)

18. Appendix B. Classification of Improvement Methods

after [55]

Quality-Based Methods <ul style="list-style-type: none"> ▪ Statistical Process Control (SPC) ▪ ISO 9000 and the like ▪ QS 9000 and the like ▪ Quality Function Deployment ▪ Design of Experiments ▪ A host of analytical methods & tools that may be used in conjunction with other methods as well – see below.* 	Activity-Based Methods <ul style="list-style-type: none"> ▪ Activity Based Costing ▪ Activity Based Management ▪ Customer Costing ▪ Product Costing ▪ Activity Based Budgeting ▪ Economic Value Added (EVA) ▪ Supply Chain Analysis/Management
Time-Based Methods <ul style="list-style-type: none"> ▪ Lean Manufacturing ▪ Time to Market ▪ Time Compression Management ▪ Cycle Time Analysis ▪ Just in Time ▪ Kanban ▪ Setup Reduction (1-minute die change) ▪ Total Productive Maintenance ▪ Concurrent Engineering ▪ Design for Manufacturing/Assembly 	Employee-Based Methods <ul style="list-style-type: none"> ▪ Compensation (e.g. Scanlon Plan) ▪ Self-directed Work Teams ▪ Learning Organization ▪ Skill-based Pay ▪ Employee Involvement
Technology-Based Methods <ul style="list-style-type: none"> ▪ Information Transfer ▪ EDI ▪ Internet Based Communication & Processing ▪ CIM ▪ CAD/CAM ▪ Planning ▪ MRP ▪ MRPII 	Process-Based Methods <ul style="list-style-type: none"> ▪ Business Process Reengineering ▪ Best Practices ▪ Benchmarking ▪ Theory of Constraints – Debottlenecking ▪ Process Mapping ▪ Storyboarding ▪ Supplier Management - Cost Effective Purchasing – supply Chain or Value Chain Management ▪ Lean Manufacturing

*A partial list of tools:

▪ Pareto Analysis	▪ Run Charts
▪ Histogram	▪ Correlation Analysis
▪ Scatter Diagram	▪ Response Surface Analysis
▪ Process Capability Analysis	▪ Control Charts
▪ Cause and Effect Diagram	▪ Design Of Experiments
▪ Failure Mode Effects Analysis (FMEA)	▪ Probability Analysis
▪ Root Cause Analysis	▪ Creative Problem Solving
▪ Five S (lean)	▪ Value Stream Mapping (lean)
▪ Kanban (lean – Toyota Production Sys.)	▪ Poka Yoke – Error Proofing (lean – TPS)

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