

# Deming-based Lean Six Sigma stewardship

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## ABSTRACT

This paper describes the synergistic style of stewardship created by integrating the meta theory of management developed by W. Edwards Deming, the tools and methods of Lean Manufacturing and Six Sigma Management, and the administrative systems of the Japanese Way of Total Quality Control to improve the welfare of all shareholders of an organization: investors, employees, customers, vendors, regulatory agencies, buildings and grounds, the environment, etc. It is called Deming-based Lean Six Sigma Management (DBLSS). It also expands Dr. Deming's meta theory of management by adding a fifth discipline which is the Theory of Communication. Its purpose is to spread DBLSS and any other new idea within and between organizations and people. Further, the paper presents a major change to the purpose of the Japanese Way of Total Quality Control by restating the purpose of JTQC from "improve customer satisfaction" to "improve customer satisfaction and employee satisfaction." Finally, the paper explains that Lean thinking and Six Sigma Management are sets of tools and methods with no philosophical guidance to ensure they are used to improve the satisfaction of all shareholders. It clarifies that traditional management's purpose is to optimize stockholder welfare, while DBLSS management's purpose is to optimize all shareholders' welfare.

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## Introduction

Deming-based Lean Six Sigma stewardship creates the cultural transformation required to create satisfaction for all shareholders of an organization. It creates joy in work that releases the power contained in intrinsic motivation. This intrinsic motivation, along with the commitment of the C-suite and Board of Directors, uses the tools and methods of Lean thinking and Six Sigma management, and the administrative systems of the Japanese Way of Total Quality Control under the management theory of W. E. Deming to create a win-win outcome for all shareholders.

## Deming-based Lean Six Sigma stewardship

### Introduction

Deming-based Lean Six Sigma stewardship is the syntheses of several areas of knowledge, they are: (1) Dr. W. Edwards Deming's theory of management, (2) Six Sigma Management DMAIC model for improvement and Six Sigma DMADV model for invention and innovation, (3) Lean thinking tools and methods, and (4) the Administrative Systems of the Japanese Way

of Total Quality. All the above four theories and methods are discussed in the literature as can be seen in the following paragraphs.

The purpose of this paper is to integrate all four theories of process improvement into one synergistic theory of management called Deming-based Lean Six Sigma Management (DBLSS). The purpose of DBLSS Management is to create a win-win scenario for all shareholders of an organization.

### ***Dr. W. Edwards Deming's System of Profound Knowledge, the 14 Points for Management, and the 7 Deadly Diseases***

The purpose of Dr. Deming's Theory of Management is to promote "joy in work" to release the power contained in intrinsic motivation. His theory is comprised of the System of Profound Knowledge (Deming 1994; Gitlow et al. 2017; Baker 2017), the 14 Points for Management (Deming 1982a, 1982b, 1994; Gitlow et al. 2017; Baker 2017; Gartner and Naughton 1988; Scherkenbach 1986), and the 7 deadly diseases (Deming 1994); (Baker 2017). This creates a meta-theory of management and life which leads to

wealthier investors, happier customers and employees, and improved processes. All shareholders are better off!

Promoting “joy in work” releases the power contained in intrinsic motivation through 5 managerial paradigm shifts taken from the System of Profound Knowledge (Gitlow et al. 2017), the 14 Points for Management, and the 7 deadly diseases. The first four managerial paradigm shifts come from the four components of the System of Profound Knowledge (Gitlow et al. 2017) and the fifth comes from the Theory of the Diffusion of Ideas (Rogers 2003), a subset of the Theory of Communication. The five paradigm shifts are:

1. Optimize the Whole System, Not Just Your Component of the System. (Ackoff, R., <https://www.youtube.com/watch?v=OqEeIG8aPPk>).
2. Improve the Process to Get Results, Don't Just Demand Results.
3. Balance Intrinsic and Extrinsic Motivators, Don't Only Use Extrinsic Motivators.
4. Promote cooperation, not competition, if the aim of the system is not to win.
5. Optimize communication within and between departments, do not allow technical jargon. Siloed management impedes the flow of information through the arteries and veins of an organization (system). The theory of the diffusion of ideas is critical to promote this paradigm shift (Rogers 2003). This paradigm shift is about how to spread Deming-based Lean Six Sigma management throughout an organization (system) and between organizations and people.

### **Six Sigma Management models for improvement and innovation**

Six Sigma Management is the relentless and rigorous reduction of unit-to-unit variation in all critical processes that affect the bottom and top lines of an organization (Gitlow et al., 2017). Six Sigma is a set of interrelated tools and methods with no philosophy to guide its use. Deming's theory of management comes into to play here in a synergistic way to create organizations that are win-wins for all shareholders.

### **Lean thinking**

Lean thinking is the reduction of waste (muda) in all critical processes in and between organizations

and the environment (Lathin 2001; Womack et al. 1990; Womack and Jones 1996a; Chakravorty 2009; Collins and Muthusamy 2007). Processes contain both value-added activities and non-value-added activities. Lean thinking is just a set of interrelated tools and methods with no philosophy to guide its use. Again, Deming's theory of management comes into to play here in providing a meta theory of management in which the tools and methods of Lean thinking help to promote the welfare of all shareholders.

### **Administrative systems of Japanese Way of Total Quality Control**

JTQC has a highly developed set of administrative systems by which organizational leaders can practice quality management. The administrative systems include education, training, and self-improvement; daily management; cross-functional management, and policy management.” (Gitlow and Gitlow 1994).

The purpose of the Japanese Way of Total Quality Control (Kano 1993) was to improve customer satisfaction, and later was changed to improve customer satisfaction and employee satisfaction. The assumptions required for JTQC are Iizuka and Osada (1988) and Ishikawa (1985):

1. have a customer orientation, the next process is our customer.
2. manage by fact using statistical methods,
3. use the PDCA cycle, and
4. respect humanity by using participatory management. JTQC states that it has a humanistic point of view, namely that the worker can contribute to customer satisfaction. However, JTQC's view of respect humanity comes from the French philosopher Pascal. He said: “Man is like a thinking reed.” The only difference between man and a reed is their ability to think to improve customer satisfaction according to JTQC. Unfortunately, this view excluded employee satisfaction in work. This was a blind side of JTQC. This was remedied by Dr. Noriaki Kano after his work at Florida Power & Light Company (1989) by restating the purpose of JTQC to be: “to improve customer satisfaction and employee satisfaction.” Again, Deming's theory of management comes into to play here in a synergistic way by considering all shareholders' welfare (Gitlow 1995, 1993-1994).

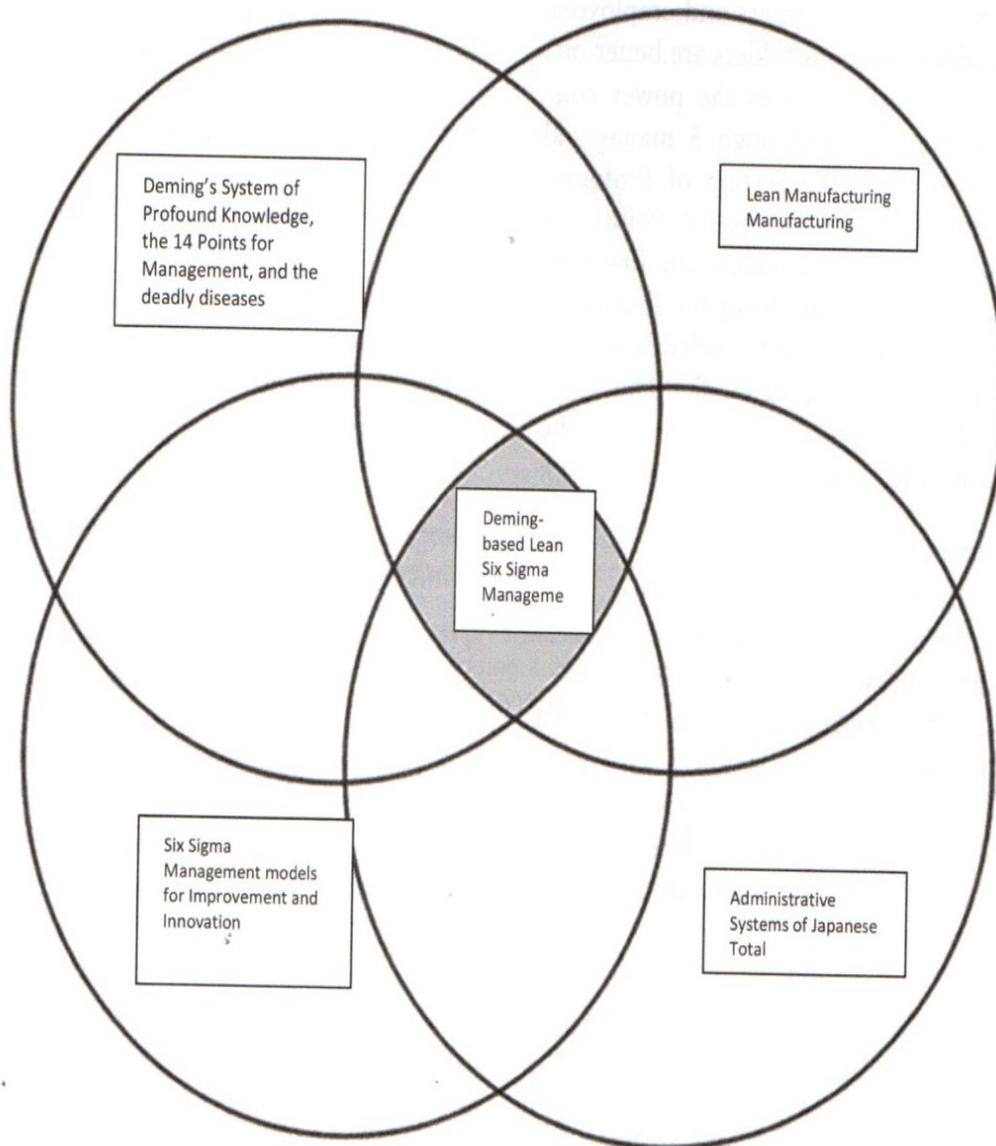


Figure 1. shows the intersection of the four components of Deming-based Lean Six Sigma management.

Parts of Deming-based Lean Six Sigma Management have been applied in manufacturing industries, service industries, the military, healthcare systems, education, and all other sectors of the economy (Deming 1994) (Figure 1).

### The synergy

This section describes some of the important synergies of combining Deming's theory of management, the Japanese Way of Total Quality Control, Lean thinking, and Six Sigma management. There are seven two-way interactions between all the four components of Deming-based Lean Six Sigma Management. The two-way interactions account for all the synergy in this theory of synergistic management. Three-way and four-way interactions are covered in the two-way interactions.

### Deming - JTQC

Deming provides a theoretical meta theory of management which maximizes all shareholder's

satisfaction, as opposed JTQC's focus only on customer and employee satisfaction.

### Synergy 1

Deming's 8<sup>th</sup> point is to "drive out fear" (*in the organization*) is a powerful idea for how managers should respect the humanity of their employees. One of the assumptions of JTQC is "to respect humanity by using participatory management." As noted above in the JTQC section, assumption 4, JTQC considers respect for humanity as respecting workers for their contributions to customer and employee satisfaction. This is a far cry from Deming's "drive out fear." Deming's theory of management comes into play here in a synergistic way because it focuses on the policies and procedures of organizations that create fear such as budgets that yield targets and quotas that are beyond the capability of the employee to meet them and performance appraisal systems that don't consider the effect of the system on the employee's performance. This is a positive contribution of Deming to JTQC.

### **Synergy 2**

Anderson et al. (1994) state that there is only anecdotal evidence that Deming's theory of management works. In the author's opinion this is because it has no administrative systems which operationalize it. Each organization must find their own way to promote "joy in work." This is an overwhelming task that impedes the promotion of Deming's theory of management. JTQC has excellent administrative systems that have been successfully used to promote quality, for example, all the companies since 1950 that have won the Deming Prize for excellence for JTQC. This is a positive contribution of JTQC to Deming's theory of management.

### **Synergy 3**

JTQC has cross-functional management for setting policy. Deming has the System of Profound Knowledge for setting policy. When put together cross-functional management teams can use the Deming's System of Profound Knowledge to set better policies than either Deming or JTQC can alone. This is an important synergy, for example, see setting a corporate wide policy for cutting costs (Gitlow and Gitlow 1994, chapter 5).

### **Deming – Six Sigma**

Deming provides behavioral boundaries to the application of Six Sigma tools and methods. Six Sigma is just a set of tools that can be used to increase productivity for the benefit of stockholders at the expense of other shareholders (e.g., employees, vendors, customers, the environment, building and grounds, etc.).

### **Synergy 1**

Targets are a big point of contention between Deming and Six Sigma. Deming believes that the only valid target is a rational one (e.g., a break-even value), most targets are just wishes of management (e.g., irrational target set to meet an arbitrary R.O.I.). A valid target (Voice of the Customer) according to Deming is one that is consistent with the capability of the process (Voice of the Process). Six Sigma has no such restrictions on targets. This can be seen in the setting of project objectives for a Six Sigma project. Six Sigma project objectives are comprised of 5 parts, the process, the metric, the target for the metric, a direction for the metric (*this seems redundant with the target*), and a deadline to hit the target. The target for the metric is frequently irrational, e.g., become a  $6\sigma$

process in 3 months. Deming would ask "by what method will the team achieve a  $6\sigma$  process in 3 months?" A possible answer might be: By using the DMAIC model." This is not acceptable because it has too many unknowns that makes a 3-month deadline irrational. In an organization that promotes DBLSS the target would be eliminated, and the direction would be used by team members to allow them to improve a process as fast as good science and managerial commitment allows; this is a synergistic result of combining Deming and Six Sigma.

### **Synergy 2**

The definition of Six Sigma focuses on 3.4 DPMO with a 1.5 sigma shift in the mean. This assumes a stable perfectly normal distribution and a shift of 1.5 sigma in the mean. The above assumptions are absurd. Neither assumption is likely to exist in real world data sets. Deming would eliminate the use of the process sigma metric as a way of comparing process within and across industries. Deming would use an empirical DPMO. This is a synergistic benefit from Deming to Six Sigma.

### **Synergy 3**

Six Sigma provides an analytic model, the DMAIC model, far superior to the PDSA cycle used by Deming, especially for complex projects. This is a synergistic improvement over the SDSA and PDSA cycles used in Deming.

### **Synergy 4**

Six Sigma provides a model for invention and innovation, the DMADV model. Deming had no formal model for invention and innovation; consequently, this adds a synergistic improvement to Deming from Six Sigma.

### **Synergy 5**

A Six Sigma project may be able to reduce the number of employees needed to do a particular job after decreasing the unit-to-unit variation in a process. Six Sigma is silent on what to do with the extra employee(s). Deming believes that it is best to keep the extra employee(s) on the payroll doing other tasks until a position opens for which they are qualified through attrition. This may incur a short-term cost of the employee's salary (assuming there is nothing for them to do in their transition period), but creates a long-term benefit of all employees knowing they have employment security, not job security.

Deming adds synergistic benefit to Six Sigma in this regard.

### **Deming – Lean**

Deming provides behavioral boundaries to the application of Lean Manufacturing tools and methods. Lean Manufacturing is just a set of tools and methods that can be used to decrease waste. There is no explicit policy on what to do with employees whose jobs are eliminated through the reduction of waste.

#### **Synergy 1**

A lean project may be able to reduce the number of employees by eliminating waste in a process. Like Six Sigma, Lean thinking is silent on what to do with the extra employee(s). As with Six Sigma, Deming believes that it is best to keep the extra employee(s) on the payroll doing other tasks until a position opens for which they are qualified through attrition. This may incur a short-term cost of the employee's salary but creates a long-term benefit of all employees knowing they have employment security, not job security. Deming adds synergistic benefit to Lean Manufacturing in this regard.

#### **Synergy 2**

Lean manufacturing requires cross training for employees which is frequently frowned upon by unions in the United States. Deming provides a meta theory which protects employees from draconian actions like firing employees who are no longer needed due to cross training. DBLSS management accomplishes this by rewarding the employee for increasing their skill set and keeps them on the payroll until an appropriate position opens-up through attrition for which they can be trained. This is due to the revised view of performance appraisal in Deming (Scholtes 1988); (Gitlow et al. 2017). The interim period allows management to let the employee explore the company for ideas for improvement.

#### **Synergy 3**

Visual Inspection is a lean method that relies on all human senses to detect problems; it is a form of mass inspection. Visual inspection is indirect contrast to Deming's "kp rule" for inspection (Deming 1994; Gitlow et al. 2015). Deming's "kp rule" determines if mass inspection should be carried out, or not, depending on the economics of inspection; of course, routine samples are taken from the process to determine

which case is currently needed. There is synergistic connection between Deming and Lean in respect to inspection policy. The "kp rule" is a synergistic improvement over visual inspection.

#### **Synergy 4**

Lean is comprised of a unique set of tools and methods not found in Deming's theory of management. This is a synergistic advantage Lean Manufacturing give to Deming.

### **JTQC – Six Sigma**

JTQC provides administrative systems that create an organization that can implement Six Sigma under the theoretical umbrella of Deming's theory of management for the benefit of all shareholders.

#### **Synergy 1**

Six Sigma management projects are most useful when used in the structure created by daily management, cross-functional management, and policy management. This structure ensures that all Six Sigma projects are aligned to move the organization toward its mission using an organizational dashboard (policy management). This is a synergistic advantage JTQC gives to Six Sigma Management.

#### **Synergy 2**

JTQC relies on the SDSA and PDSA cycles for improvement of processes. Six Sigma provides the DMAIC model for improving processes which is a more robust model. This is a synergy given to JTQC from Six Sigma.

#### **Synergy 3**

JTQC has methods for inventing and innovating processes, products, and processes; however, these models are not as easy to use the Six Sigma DMADV model. Again, Six Sigma synergistically advances JTQC in respect to invention and innovation models.

### **JTQC and Lean**

JTQC provides administrative systems that create an organization that can implement Lean thinking under the theoretical umbrella of Deming's theory of management for the benefit of all shareholders.

#### **Synergy 1**

Lean thinking projects are most useful when used in the structure created by daily management, cross-functional

management, and policy management. This structure ensures that all lean projects are aligned to move the organization toward its mission. This is a synergistic advantage JTQC gives to Lean Manufacturing.

### Synergy 2

Lean is comprised of a unique set of tools and methods not found in Japanese Total Quality Control. This is a synergistic advantage Lean Manufacturing gives to JTQC.

### Six Sigma and Lean

Six Sigma and Lean Manufacturing have the same objective to create agile organizations that can do things cheaper, faster, and better. Neither has a theoretical underpinning (Deming), or the administrative systems that can prevent them from being used to maximize stockholders' satisfaction at the expense of other shareholders' satisfaction.

### Synergy 1

"Lean Six Sigma" has become a popular term. This term describes the synergistic relationship between Lean thinking and Six Sigma management. Lean tools and methods are potential change concepts for process improvement that can be used in the Analyze Phase of the DMAIC model. These tools and methods are the 5S method, Total Productivity Maintenance (TPM), Single Minute Exchange of Dies (SMED), Mistake Proofing (Poke-Yoke), and Value Stream Mapping (VSM). Together Lean and Six Sigma create a far more powerful set of tools and methods for process improvement than either alone.

### Future research

DBLSS management has been anecdotally demonstrated as a viable theory of management that is superior to traditional management. DBLSS management has already been successfully tested at a large urban hospital. Future research is needed to improve DBLSS theory and to test it in many more types and sizes of organizations.

### Disclosure statement

The authors report no conflict of interest.

### About the Author

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