

---

**DECISION SCIENCES INSTITUTE**

Was Deming Agile? Looking at Information Technology Frameworks and Practices

Dana P. Miller  
Miami University  
[mille704@MiamiOH.edu](mailto:mille704@MiamiOH.edu)

Timothy C. Krehbiel  
Miami University  
[krehbitc@MiamiOH.edu](mailto:krehbitc@MiamiOH.edu)

**ABSTRACT**

This paper attempts to understand the relationship between W. Edwards Deming's quality management philosophy and information technology frameworks and practices, particularly Agile. We contend that the Deming philosophy has contributed to an evolutionary set of information technology frameworks and practices, including IT Service Management (ITSM), Capability Maturity Model Integration (CMMI), Enterprise Architecture (EA), and Agile. We believe that these approaches are often suboptimal due to a lack of understanding the importance of a systems perspective. One approach to a larger systems view is through using Agile within the context of Lean.

**KEYWORDS:** Quality Management and Systems, Agile, System of Profound Knowledge

**INTRODUCTION**

Quality management is seen as the evolutionary progression of human organization methods from interchangeable parts, the assembly line, scientific management, and statistical quality control to improve product and service consistency. With increasing intensity since the end of World War II, quality management thought has spread from manufacturing into service sectors such as [sales](#), marketing and customer service and more recently health care, K-12 education, and higher education.

The modern era of quality management associated with manufacturing can be roughly traced from the statistical quality control work of Walter Shewhart at Western Electric in Chicago in the 1920s to the influence of W. Edwards Deming and Joseph Juran on the United States wartime economy in the 1940s and their subsequent influence of the post-war economy of Japan. The rise of quality and manufacturing competitive position in the post-war Japanese economy produced a delayed reaction by US industry in the 1980s to embrace modern quality management. The acceptance of quality management in the United States took on many forms in the 1980s such as Total Quality Management, Six-Sigma and the Malcolm Baldrige National Quality Award. Quality management was further codified in the 90s with the term Lean.

It is perceived the Toyota Production System is possibly the closest an organization has come to implementing and refining Deming's theories (at least in the car production industry). Cynics would say that we tried Deming back in the 80s, we called it Total Quality Management (TQM), and it didn't work. Perhaps Deming's thought is still here but only disguised in Lean and Agile garb and is not recognized as the voice railing against the American style of management in the

80s. Often there is an effort to distance improvement efforts from Deming's ideas since they have been perceived to not work. Perhaps Jack Welch has been viewed to make them work in a small way due to GE's embracement of Six Sigma and the company's share price rise during his tenure? Perhaps the reason Deming's ideas have not worked is that his ideas have never been fully implemented in organizations? Perhaps Deming's ideas did not work is because they are totally revolutionary (but revolutionary without the reign of terror and guillotines and should still have a place in our future)?

To begin our quest for answering the question, "Was Deming Agile?", we searched five databases (Applied Science & Technology Full Text, Business Source Complete, Business Source Complete, and Computers & Applied Science Complete) using the four variants of "Deming" and "Agile" included in a "Title" and "Subject Areas." Fifteen to twenty articles were found when searching on variants of "Agile" and "Total Quality Management." However, direct linkages and in-depth analyses of Deming's work and the Agile movement are not found in the academic literature. Instead, we found an evolution from Deming's work to modern Agile thinking and practices that interweaves through TQM, ITSM, CMMI, EA, the Agile Manifesto, and modern interpretations of Deming's 14 points. Thus the layout for this paper is the progression of thought from Deming's landmark work in the 1980s to the current state of Agile. We conclude with the contention that using Agile and Lean together provides an opportunity to infuse Agile with a systems view currently under-appreciated in the Agile community.

## DEMING'S SYSTEM OF PROFOUND KNOWLEDGE

Deming (1982, 1986) challenged current management practices in the 1980s. Table 1 presents his 14 Points for Management that provides the groundwork for his theory of management. (Conklin (2014) provides a contemporary interpretation of Deming's 14 Points). Deming's theory was coined Total Quality Management (TQM) and business, education, military and government organizations jumped on the TQM bandwagon. Deming believed most efforts were superficial and lacked a systems perspective:

*"Most people imagine the present style of management has always existed, and is a fixture. Actually, it is a modern invention -a prison created by the way in which people interact. This interaction afflicts all aspects of our lives-government, industry, education, healthcare. We have grown up in a climate of competition between people, teams, departments, divisions, students, schools and universities. We have been taught by economists that competition will solve our problems. Actually, competition, we see now, is destructive. It would be better if everybody would work together as a system, with the aim for everybody to win. What we need is cooperation and transformation to a new style of management." (Deming, 1993, p. xi)*

Deming referred to the new style of management as a System of Profound Knowledge (SoPK) which has four parts: (1) Appreciation for a system; (2) knowledge about variation; (3) theory of knowledge; and (4) psychology. To a certain degree, SoPK was a re-packaging of Deming's 14 points.

Those that want to use SoPK to change organizations to be more cooperative and systematic will often feel like the alien Klaatu in the 1951 science fiction film, *The Day the Earth Stood Still* (Blaustein, 1951). Klaatu comes to earth with a message that must be revealed to all the world's leaders simultaneously to warn humans they need to change their competitive and warring ways to avoid total destruction. He is only met with earthly obstacles such as being shot by a soldier

upon arrival and that a meeting with the U.S. President in the current political climate is impossible. Kilaatu suggests that he be allowed to go among humans to better understand their attitudes and suspicions.

**Table 1. Deming's 14 points for management**

<b>Deming's 14 Points</b>	<b>Description</b>
1. Constancy of Purpose	Create constancy of purpose toward improvement of product and service, with the aim to become competitive and to stay in business, and to provide jobs.
2. Adopt the New Philosophy	We are in a new economic age. Western management must awaken to the challenge, must learn their responsibilities, and take on leadership for change.
3. Cease Dependence on Mass Inspection	Cease dependence on inspection to achieve quality. Eliminate the need for inspection on a mass basis by building quality into the product in the first place.
4. End the Practice of Awarding Business on the Basis of Price Tag	Instead, minimize total cost. Move toward a single supplier for any one item, on a long-term relationship of loyalty and trust.
5. Improve the System Constantly and Forever	Improve constantly and forever the system of production and service, to improve quality and productivity, and thus constantly decrease costs.
6. Institute Training	Management needs training to learn about the company, all the way from incoming material to customer. A central problem is need for appreciation of variation.
7. Institute Leadership	The aim of supervision should be to help people and machines and gadgets to do a better job. Supervision of management is in need of overhaul, as well as supervision of production workers.
8. Drive Out Fear	Drive out fear, so that everyone may work effectively for the company. No one can put in his best performance unless he feels secure.
9. Break Down Barriers between Departments	People in research, design, sales, and production must work as a team, to foresee problems of production and in use that may be encountered with the product or service.
10. Eliminate Slogans and Exhortations	Eliminate slogans, exhortations, and targets for the work force asking for zero defects and new levels of productivity. Such exhortations only create adversarial relationships, as the bulk of the causes of low quality and low productivity belong to the system and thus lie beyond the power of the work force.
11. Eliminate Numerical Quotas and Management by Objectives (MBO)	The responsibility of supervisors must be changed from sheer numbers to quality, and the job of management is to replace work standards (quotas) by knowledgeable and intelligent leadership. Internal goals set in the management of a company without method, are a burlesque.
12. Remove Barriers that Rob People of Pride of Workmanship	Remove barriers that rob people in management and in engineering of their right to pride of workmanship. This means abolishment of the annual or merit rating and of management by objective.
13. Encourage Education and Self-Improvement	What an organization needs is not just good people; it needs people that are improving with education.
14. Take Action to Accomplish the Transformation	Put everybody in the company to work to accomplish the transformation. The transformation is everybody's job.

---

## **POST INDUSTRIAL QUALITY MANAGEMENT AND IT FRAMEWORKS**

There appears to be a second era of quality management associated with the post-industrial rise, in the Western world, of the service sector and its associated ubiquity of information technology. Bell (1974) notes that in a post-industrial society more wealth is generated from the services than manufacturing. The post-industrial or post-modern era of quality management can be traced to the early use of mainframe computers in the 1950s in corporations, defense and higher education. The rise of the networked world in the 1990s is a key feature of the post-industrial quality management challenge where there is the capability to link multiple systems that can produce either increased or decreased efficiency with alarming speed.

The quality management concepts of waste reduction and statistical process control seemed more tangible in the manufacturing world and appeared to have little relevance to the highly variable and ephemeral information technology world of computer code and technological expertise. Miller (2014a) argued that a legacy of the military adoption of large mainframe computer systems brought with it a cumbersome, contract driven, requirement traceability laden software development method known as the waterfall model.

### **Capability Maturity Model Integration (CMMI)**

An evolution of the waterfall method was the development of the Capability Maturity Model (CMM) in 1990 by the Software Engineering Institute of Carnegie Mellon University. Jacobs (2006) viewed CMM as the blending of best practices in software development organizations and the philosophy of management gurus like Shewhart, Crosby and Deming. In 2000, the CMM was upgraded to the five-step CMMI, making it applicable to system development as opposed to just software development (Jacobs, 2006). Maturity level 1 is chaos. Maturity levels 2-4 are all about creating the organizational capability to eliminate special-cause variation. Maturity level 5 provides for continuous improvement through the gradual reduction of common cause variation (Anderson, 2012).

### **Information Technology Infrastructure Library (ITIL) and IT Service Management (ITSM)**

The nature of the modern economy had called upon organizations to rely on technical expertise to help make the transition to technology utilization. Very few modern enterprises are not intertwined with IT functions. To combat the high variability of business use of technology a framework called Information Technology Infrastructure Library (ITIL) was developed at the end of the 1980's by the Central Computing and Telecommunications Agency (CCTA), a government agency in Great Britain. The reason for this commissioning was a lack of quality of the IT services procured by the British Government, so that a method had to be found to achieve better quality and simultaneously decrease their costs (Bartlett, 2011).

ITIL originated as a collection of books, each covering a specific practice within the IT industry. Clifford & von Ban (2008), among others, believe ITIL was built around a process model-based view of controlling and managing operations often credited to Deming and his plan-do-check-act (PDCA) cycle. Today, ITIL has developed into a set of practices known as IT Service Management (ITSM) that focuses on aligning IT services with the needs of business. Although ITSM has been adopted as a best practice within some circles of the IT industry worldwide, Meyer (2005) points out several pitfalls including the power of a process manager to dictate how others work, an over-burdening strict protocol to ITSM definitions and processes, and although

ITSM provides a good definition of operational functions it is not a comprehensive definition of everything the organization needs to be successful.

A few anecdotal histories of ITIL/ITSM can be informative to review in consideration of the hermetic nature of technological innovation. Ottenheimer (2012) suggested that the British Military during the 1982 Falklands War had not experienced any major war effort since WWII and their IT had no standards and had difficulty coordinating their efforts. Second, Datamation.com (2004) postulated that the Thatcher Government was looking to outsource IT functions and IBM looked into providing the service and backed away due to lack of standardization and then funds were assigned to the CCTA to develop methods to align IT services with business requirements rather than a focus on technology.

### **Enterprise Architecture (EA)**

There has been tremendous growth in IT infrastructure over the last 50 years and there was no real systematic plan for that growth and the legacy of complexity and confusion persists. This technical legacy is also referred to as technical debt. The emerging discipline of Enterprise Architecture (EA) also provides some hope in trying to use models to explain an organization and its interactions between strategy, goals, capabilities, process, services and technology. EA can potentially help an organization with strategic decisions by creating a common business language based upon the outcomes of business capabilities.

Often the problem with organizations is that little architecture is done before the organization was created. Miller (2014b) claims that often organizations are never designed, and they are just implemented and evolve into complexity and eventual entropy. Thus, there is a difficulty in IT organizations trying to communicate with the business and concepts such as capability mapping to services (and their associated technology) could potentially help bridge the gap. We contend that Deming's system view can be applied to the practice of EA with the acknowledgement that technology is infused throughout the enterprise.

### **Agile**

The term Agile comes from the Agile Manifesto (see FIGURE 1) which was written at Snowbird Utah in 2001 by a gathering of software developers who were looking at ways to write software better (AgileManifesto.org, 2001). The impetus of the meeting was a reaction to the contract driven requirement delivery of earlier generations of software development often called waterfall. The waterfall model, that limits customer interaction and requirement gathering to the front-end of the software development process, often cumulates in a disappointing unveiling of a new product or service at the back-end. The Agile Way of Working (or Agile) is a collection of principles and practices that supports rapid and flexible response to change.

Agile attempts to bring value to the customer in smaller but more frequent intervals by promoting communication, collaboration, continuous improvement, and reflection within teams of problem solvers. The approach also fosters self-managed teams. Agile accomplishes this by embracing changing requirements, delivering products frequently, using human-centric methods, and engaging the customer in regular collaboration. Agile puts heavy emphasis on articulating goals, facilitating interactions, improving team dynamics, supporting collaboration, and encouraging experimentation and innovation (Smith & Sidky, 2009).

---

**Figure 1: The Agile Manifesto**

---

# Manifesto for Agile Software Development

We are uncovering better ways of developing software by doing it and helping others do it.  
Through this work we have come to value:

Individuals and interactions over processes and tools  
Working software over comprehensive documentation  
Customer collaboration over contract negotiation  
Responding to change over following a plan

This is, while there is value in the items on  
the right, we value the items on the left more.

Kent Beck  
Mike Beedle  
Arie van Bennekum  
Alistair Cockburn  
Ward Cunningham  
Martin Fowler

James Grenning  
Jim Highsmith  
Andrew Hunt  
Ron Jeffries  
Jon Kern  
Brian Marick

Robert C. Martin  
Steve Mellor  
Ken Schwaber  
Jeff Sutherland  
Dave Thomas

© 2001, the above authors  
this declaration may be freely copied in any form,  
but only in its entirety through this notice.

---

Agile is now used widely in software development. However, Dyba & Dingsoyr (2008) and Middleton & Joyce (2010) both noted a lack of hard empirical evidence on the adoption and success of Agile to be extremely weak. A study of nine industry surveys published in 2011 and 2012 on the rates of Agile methods usage found that although the surveys are mostly non-scientific, there are many indicators that Agile is growing and has moved into the mainstream (Stavru, 2014). These indicators include (1) the increasing number of scientific publications and specialized conferences; (2) the significant body of professional literature available; (3) a large number of active professional communities involving Agile; and (4) the increasing number of success stories from large corporations including IBM, Microsoft, SAP, Google, Apple, Cisco Systems, etc. More recently, VerisonOne.com (2014) reported 88% of respondents in a worldwide survey of the software community said their organizations were practicing Agile, and Schur (2015) reported the adoption rate to be 94% and 53% of the adopting organizations indicated that a majority of their Agile projects had been successful. Still, the lack of hard data on both the use and success of Agile is still apparent.

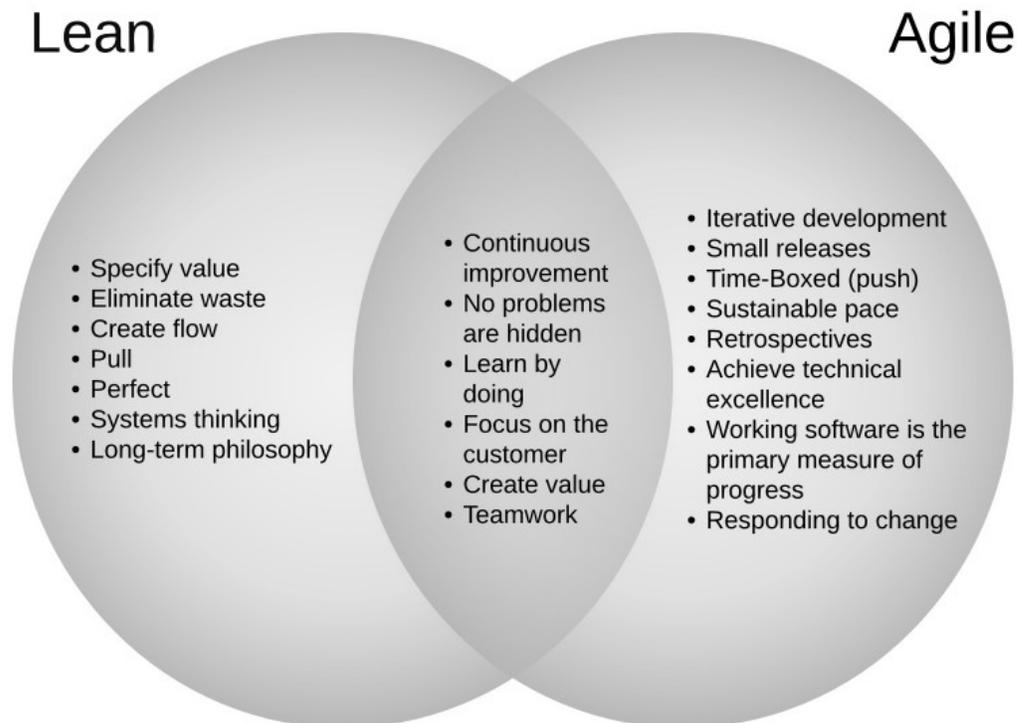
The rising and continued use of Agile corresponds with the dramatic technological changes in

our economy. Younger companies and start-ups are in a better position to adopt Agile methods than older organization such as the military, higher education or large corporations which are often siloed in functional areas. A discussion with a colleague who worked many years at Amazon starting in 1997, the year the company became publically traded, said there was no adoption of Agile at the company because they had always been using Agile methods (personal communication, April, 16, 2014). Amazon also views itself as a technology company where there is not a separate department called IT but rather IT is infused in the organization and is there to support the products and services of the company. The likely evolution of IT Departments is that they become commodity brokers of service utilities such as networks email, etc., and more specialized functions will be fused into business units.

### Comparing Lean And Agile

Before the software developers met at Snowbird Utah in 2001, Womack, Jones, & Roos (1990) and Liker (2004) analyzed the Toyota Production System and made the term Lean an easy handle to hang on the evolution of industrial processes looking to remove waste and generate value for a customer. In Figure 2 we see that Lean and Agile share many of the same basic ideas and characteristics. Simply put, both Lean and Agile are looking to remove waste from a process that is (supposedly) generating value for a customer.

**Figure 2: Lean and agile**



---

One contrast is Lean requires “pull” and the time-boxed iterations of Agile is basically a “push” system. Second, the systems orientation of Lean, perhaps originating from the early connections between Deming and the Toyota Production System, is not clearly apparent in Agile. Chan (2013) conducted a similar analysis and also concluded that Lean and Agile have much in common but that the principles are not directly aligned. Chan noted the need for Agile to adopt a Lean mindset that focuses on optimizing the entire value stream and not optimizing separate technologies, and refers readers to an article posted by the Lean Enterprise Institute and the following quote:

*“... lean thinking changes the focus of management from optimizing separate technologies, assets, and vertical departments to optimizing the flow of products and services through entire value streams that flow horizontally across technologies, assets, and departments to customers.”* Lean Enterprise Institute (2013)

In other words, Agile suffers from the lack of a systems view of the enterprise.

Anderson (2012) discusses a common conflict software developers have with Lean concepts due to their perception that Lean is associated with process. Developers often view their work as more creative rather than process driven and Agile can be potentially seen as a creative ally but Lean is often viewed as a lumbering process that will stifle creativity. This conflict can be mitigated with a systems view that recognizes innovative effort requires a creative process to design new products and services, and a respect for the innovation also needed to adapt to the long-term philosophy of creating value for the customer.

## **THE AGILE MANIFESTO AND DEMING’S PHILOSOPHY**

As noted earlier, our literature search found no journal articles which explore direct linkages between Agile and the Deming Philosophy. The dearth of publications in refereed outlets, hints at the notion that individuals practicing Agile see little value in the bureaucratic, long process of bringing academic research articles to fruition. However, several books and numerous blogs on Agile do speak directly to Deming’s work. Kulak (2011) and Hunter (2012) both hypothesize that while many Agile practitioners have never heard of Deming, a lot of their work is consistent with his philosophy. Smith & Sidkey (2009, p. 244) argue that the concept of ceasing dependence on mass inspection to ensure quality aligns well with Agile thinking and noted that “Building quality into the product sounds clichéd and has been overused by many marketing department. But in an Agile environment, the concept is real and tangible.” And, Goodpasture (2015, p.71) writes “Deming focused on eliminating unsatisfactory results before they reached the customer. In Agile parlance, every object must pass its unit, functional, and system test.” Yousuf (2009) and Anderson (2012) also noted this alignment with the Agile approach.

In addition to ceasing dependence on mass inspection, Anderson (2012) reported explored relationships between Agile and several other of the 14 Points. Table 2 identifies area of close alignment, particularly in areas of gaining knowledge through education and training, and intrinsically motivating workers by removing fear and barriers to pride of workmanship. It is illuminating to point out that the mapping exercise in Table 2 is silent to many of the points dealing with leadership and an enterprise-wide systems approach. It is important to note that Deming (1993, p. 91) emphasizes that point #1, constancy of purpose, is all about the aim and purpose of the system, and without it, companies are doomed before they even get started.

**Table 2. Mapping Deming's 14 points for management to Agile**

<b>Deming's 14 Points</b>	<b>Anderson's Mapping to the Agile Way of Working</b>
1. Constancy of Purpose	Silent
2. Adopt the New Philosophy	Silent
3. Cease Dependence on Mass Inspection	Agile practice of test-first (or test-driven) development.
4. End the Practice of Awarding Business on the Basis of Price Tag	Agile principle of building trust between developers and customers.
5. Improve the System Constantly and Forever	Silent
6. Institute Training	Agile practices such as pair programming encourage on-the-job training.
7. Adopt and Institute Leadership	Silent
8. Drive Out Fear	Agile principle of working at a sustainable pace, along with Agile practices such as using visual management Kanban boards with self-organizing teams help mitigate fear.
9. Break Down Barriers between Departments	Agile practice of organization-spanning roles collaborating with specialist roles.
10. Eliminate Slogans and Exhortations	Silent.
11. Eliminate Numerical Quotas and MBO	Silent.
12. Remove Barriers that Rob People of Pride of Workmanship	Agile practice of short, iterative delivery cycles where everyone on the team gets to see the finished work and demonstrate it to the customer removes barriers to pride in work and help focus everyone on quality.
13. Encourage Education and Self-Improvement	What an organization needs is not just good people; it needs people that are improving with education.
14. Take Action to Accomplish the Transformation	Silent

The implications of this analysis are perhaps best articulated through the four parts of Deming's System of Profound Knowledge (SoPK). Table 3 reflects our conclusion that Agile is strong with respect to Psychology and Theory of Knowledge, moderate with respect to Understanding Variation and weak with respect to Appreciation of a System. Lean thinking could be used to overcome the shortage of a system's view in Agile.

**Table 3: System of Profound Knowledge (SoPK) and strength of relationship with Agile**

<b>System of Profound Knowledge</b>	<b>Description</b>	<b>Strength of Relationship with Agile</b>
Appreciation for a System	It is important to optimize the <i>entire</i> system (a set of activities and processes that work together for the long-term benefit to all stakeholders), not separate components of the system. Optimization of all components separately, rarely leads to optimal system performance. Requires knowledge of Systems Theory.	Weak
Understanding Variation	It is important to understand the variation in a process including the difference between common-cause and special-cause variation. Proper data analysis is required to understand root causes of observed failures and successes. Requires knowledge of Statistics.	Moderate
Theory of Knowledge	It is important to understand that knowledge comes from theory and no number of examples or observations establishes a theory. However, a single observed contradiction to a theory necessitates modification or abandonment of that theory. Requires knowledge of Epistemology.	Strong
Psychology	It is important to understand people and the interactions between people and circumstances, managers and employees, employees and customers. Managers need to learn how to intrinsically motivate their team.	Strong

## USING LEAN AND AGILE TOGETHER

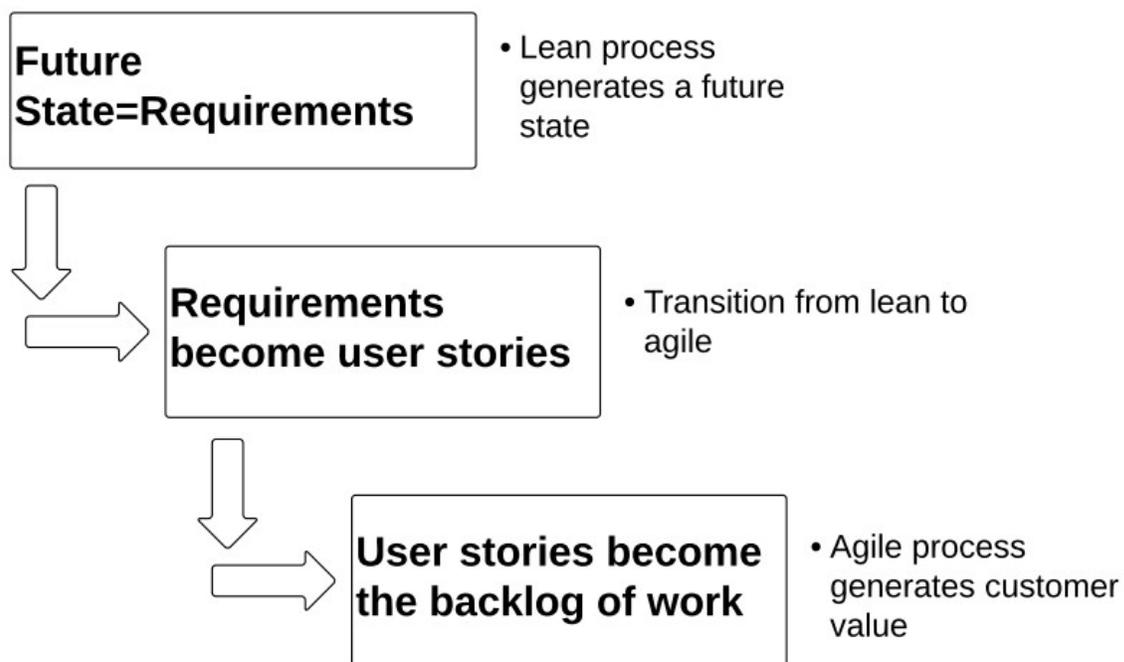
Shalloway, Beaver & Trott (2010) and Shalloway (2016) notes that Agile teams often struggle and suggests using Leanban, an approach based on Lean-Thinking that incorporates several agile practices such as Kanban, Scrum, and eXtreme Programming. Further, there is the perception that if a project group (software developers, product designers, etc.) is using an Agile method they don't really need requirements: they can just start building something. But if there are no clear requirements up front, then the output will be unsatisfactory (Hoffmann, 2015; Johnstone, 2015).

One strategy to incorporate a system perspective into the Agile way of working is to use the Lean method to generate basic requirements. Middleton & Joyce (2012) provide examples

where Lean and Agile ideas have been fused together, including work done by BBC World-Wide where SPC methods were used to measure Agile software development. Miller (2014b) presented an example where university student change of program forms are still paper and processed differently all over campus. A standardized, electronic workflow process needs to be developed to improve the student change of program processing capability. A Lean method can be used to understand the current state in all areas processing student change of program forms. Once the current state is understood then a future state that serves all areas is developed and forms the basis of requirements for the Agile method to develop the technical solution.

Figure 3 illustrates how Lean and Agile work together. We have used this approach on several projects, and the preliminary assessment of the methodology is positive.

**Figure 3: How lean and agile work together**

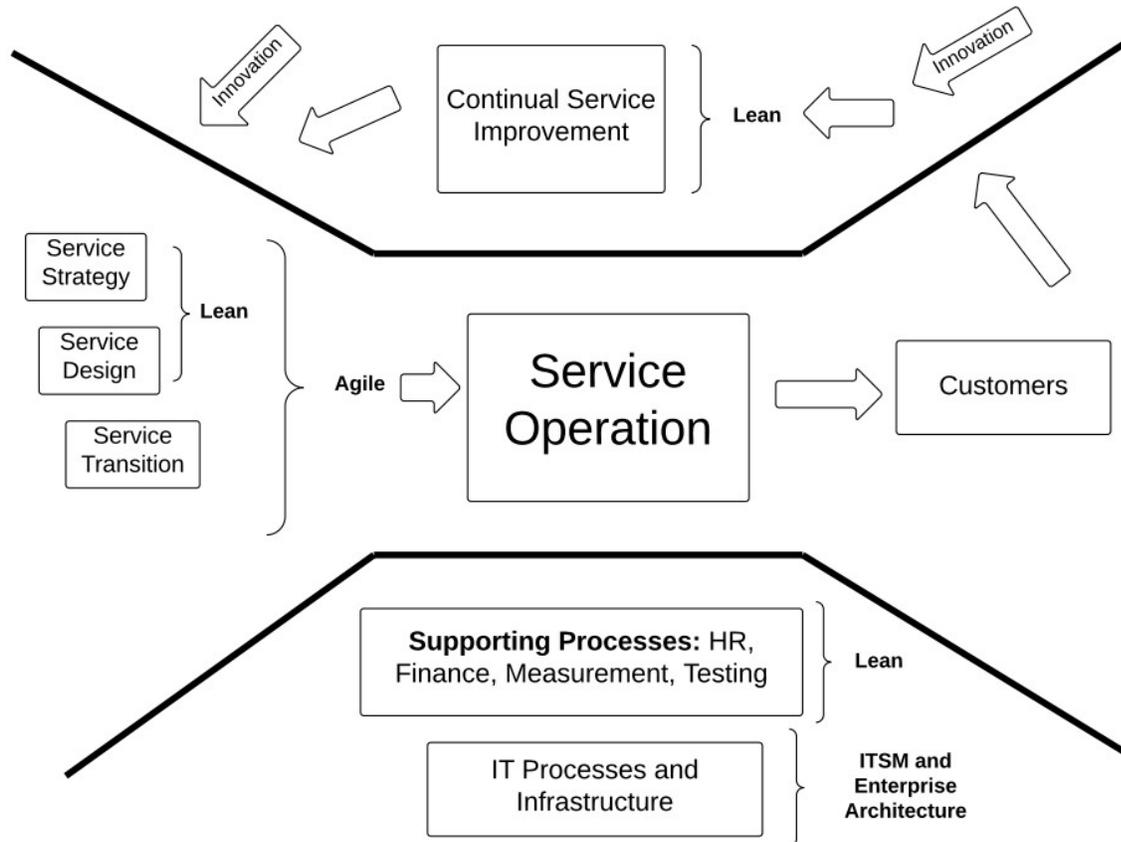


### It's The System and Change is Hard

Most improvement efforts that focus only on the use of tools often fail and sputter out. The elusive nature of change and improvement can be traced to the culture of the workplace. We can see the thin historical threads of waste removal in the Deming-based quality movement that flows through Lean and Agile, but understanding how these useful tools can be applied to the rapidly changing, technology based, service economy can be challenging. Perhaps there can be progress made if one looks at all the tools and acronyms such as Agile, Lean, CMMI, ITSM, and EA in a holistic manner with a systems perspective. In Figure 4 we illustrate a system's view how Lean and Agile and can become part of a service operation system, from design to the

customer. The model illustrates the various components of the system and the intricate interdependence among those components. Optimization of the system requires communication and collaboration. This model can also be used for product development and improvement.

**Figure 4: A systems view incorporating Lean and Agile**



**Expertise Silos Generate Fear**

Humans progressed into the agrarian era by developing silos to store a surplus of agriculture and we have continued the practice through the industrial and modern technology knowledge age by creating expertise silos. Often there is translation from technical expertise to best practice frameworks expertise but there still tends to be a disconnection between experts and the business areas that provide value to the customer and in the end pay the bills. Much like the siloization of education and higher education in particular, pools of disparate expertise, followed the same pattern into the modern workplace where islands of experts have difficulty understanding one another. The hierarchical nature of organizations attempts to associate expertise with those in power but increasing complexity often does not allow a higher rank to span multiple areas of expertise.

In organizations you have groups of people that view themselves as experts in their areas but in the sum total you don't have an organization aligned with a common aim. You have the production people; IT people; process people; improvement people; Lean people; Agile people; ITSM people; facilities people; marketing people; teaching people, etc. Managing a complex organization without a systems view regarding strategic planning, process, people and technology will lead to overall sub-optimization. Leadership is about creating and managing a system that has an aim, provides value to customers and allows employees to succeed and have pride and joy in work.

Often methods of improvement get attached to the various islands of experts. Agile is only good for software developers. Lean is only good for cutting costs and removing waste in a manufacturing setting or physical service areas such as facilities or food service. ITSM is for the process geeks. We don't need to use Six-Sigma or statistical process control here because we are not making jet engines. Often an improvement effort is started in one silo of an organization and resisted or feared in other parts of the organization meanwhile the whole organization is sub-optimized. The Not-Invented-Here (NIH) phenomenon starts where false pride often drives one part of an enterprise to use a less-than-perfect invention in order to save face by ignoring, boycotting, or otherwise refusing to use or incorporate potentially superior solutions by others. Round and round the misunderstanding goes on in the modern workplace.

Evolving methods and disciplines such as EA and ITSM are being used to attempt to understand organizational complexity and enable improved strategic decisions and also improve IT process stability. Agile has been adopted by organizations to build usable software. Lean and Six Sigma are looked at as tools to improve business process that rely on IT. These tools and methods are used by both product and service organizations often in small, sporadic attempts usually with much implementation confusion as there is generally difficulty by leadership in providing a unified view of the change effort and limiting the long-term value production of the effort. Workers in organizations attempting to change for the better often view the methods of Lean, Six Sigma, Agile, ITSM and EA as separate, transient, non-aligned or even contradictory methods.

The anxiety that runs beneath change efforts is revealed in a conversation with an IT manager who responded negatively to a Lean effort to reduce or avoid costs in their organization. The manager had fear the same amount of budget would not be provided the next year if the Lean efforts were acted upon to identify waste and reduce or avoid costs (personal communication, February, 24, 2015). This view potentially contains a lack of systems perspective, a misunderstanding of Lean or having a biased understanding such as Lean is only for manufacturing and Agile is only for software and the two don't work together?

Another source of organization improvement misalignment is the constant need to label and package ideas that can potentially create change and provide value. Perhaps this need is also driven by the voracious need of easy fixes, marketing, ranking and rating in society? Deming was never a great packager of things. The closest he came was developing the SoPK, which on first appearance, is basically a re-packaging of his 14 points. Understanding and implementing the SoPK requires quite a bit of upfront study and then one needs the environment, courage, capability and long-term view to follow through on the ideas.

To survive into the future, the reliance on experts needs to shift to incorporate holistic systems thinking and experimentation that can contribute to a view of how the organization can provide continually improving products and services. In the fear generating, hierarchical, expert-based,

technological worldview the systems thinkers have often found themselves in positions of what Backaitis (2014) calls “courageous despair.” They see the larger picture and keep trying to change things but are always going upstream to the prevalent competitive, command and control management systems which tends to view workers as the shifty, X-Types or worse yet turns Y-Types into X-Types!

### **The Path Forward: An Outside Systems View**

To continue with the thread of Deming’s thought expressed in the SoPK and the relationship to IT frameworks and practices we can also look through the lens of adult stage of development to develop an outside view (Backaitis, 2014). Individuals acquire a succession of empirically derived world-views through their lifetimes as evidenced by the expert phenomena. Horizontal development contributes to the expert view and vertical development contributes to the outside view that Deming called for that allows the system to understand itself. How does one gain vertical development? Possibly by learning from experiments that translate to experience and contributes to wide learning?

By having more vertical development and understanding the system, people can operate in a way that everyone (management, workers, customers, and suppliers) benefits. The current cultural personality ideal is along the lines of achiever and expert realms and is generally resistant to the outside view. Understanding the system is difficult – typically everyone views the system from his or her own perspective. Understanding the system requires that everyone rise above their individual view to understand the system in the context of the overall goal, what the organization does to achieve this goal, the boundaries and constraints, and to share the sensing and feedback mechanisms.

With an increasing world of volatility, uncertainty, complexity, ambiguity and pervasiveness of connective technologies the need for an outside systems view is needed more than ever. It appears the current culture is not producing the individuals and eventual leaders needed for a change? These larger cultural issues, which need to be addressed, are beyond the scope of this paper but could be the start of a discussion?

The current trend appears to be using Lean, Agile and the other IT frameworks and methods discussed in this paper in a scattered approach to foster process improvement, faster quality software delivery, and organizational understanding. But perhaps these methods can be viewed also as methods to implement SoPK in a small way? Deming, if he were around, would be open to new interpretations of his ideas.

### **CONCLUSION**

Deming was Agile. But being Agile does not mean an individual or organization fully embodies the Deming Philosophy. One of the four principles of Deming’s System of Profound Knowledge is Systems Theory, which the Agile movement and current Agile practices have not fully embraced. We believe this lack of systems thinking is often the root cause for the mixed results with Agile initiatives, and that the use of Agile practices within a Lean initiative with a strong systems approach is a valid attempt to overcome that shortcoming.

### **EPILOGUE**

---

The cultural challenges facing organizations involved in making process improvement progress, providing a systems understanding, reducing fear, and providing employees with pride and joy in work can be seen in the conversation with a friend and former coworker who is a locksmith and has been working in an organization that is 6 years into a Lean implementation (personal communication, December, 27, 2016).

Author: How are things going at work?

Locksmith: Same old sh--t but with new bosses. What was that mind control bulls--t they played on us...5S or something like that?

Author: You mean, "Lean".

Locksmith: Yeah, "Lean". (Shaking his head left-to-right). Yeah, I was on a Lean Project. I worked for a year on a project to figure out how much to charge for a key. We were charging 8 bucks a key and I did all this analysis work and figured we should be charging 14 bucks a key. Then the boss said we should just charge 16 bucks. What a load of crap. I did all this work and he just came in and said charge 16 bucks!

## REFERENCES

- AgileManifesto.org. (2001), Manifesto for agile software development. Retrieved from <http://agilemanifesto.org>, March 14, 2016.
- Anderson, D. J. (2012). *Lessons in agile management*. Sequim, WA: Blue Hole Press.
- Backaitis, N. (2014). The transformation Deming called for: A view through the lens of adult stage development. *Deming Annual Conference*. West Lafayette, IN: The Deming Institute.
- Bartlett, R. (2011). Improve Service Delivery with ITIL. *System iNEWS*, 386, December, 13-17.
- Bell, D. (1974). *The coming of post-industrial society*. New York: Harper Colophon Books.
- Blaustein, J. (Producer), & Wise, R. (Director). (1951). *The day the earth stood still* (Motion Picture). United States: 20<sup>th</sup> Century Fox.
- Chan, K. (2013). Lean vs. agile. Retrieved from <http://www.onedesk.com/2013/07/lean-vs-agile/>, March 20, 2016.
- Clifford, D., & van Bon, J. (2008). *Implementing ISO/IEC 20000 certification: The roadmap. ITSM library*. Amsterdam, The Netherlands: Van Haren Publishing.
- Conklin, J. D. (2014). Whole new world: Seasoned quality professionals rethink Deming's 14 points for a new generation. *Quality Progress*, 78(12), December, 52-57.
- Datamation.com. (2004). History of ITSM and ITIL. Retrieved from <http://forums.datamation.com/showthread.php?32-History-of-ITSM-and-ITIL>, March 20, 2016.
- Deming, W. E. (1982). *Out of the crisis*. Cambridge, MA: Massachusetts Institute of Technology, Center for Advanced Engineering Study.

- 
- Deming, W. E. (1985). Transformation of Western style of management. *Interfaces*, 15(3), May-June, 6-11.
- Deming, W. E. (1993). *The new economics: For industry, government, education*. Cambridge, MA: Massachusetts Institute of Technology, Center for Advanced Engineering Study.
- Dyba, T., & Dingsoyr (2008). Empirical studies of agile software development: a systematic review. *Information and Software Technology*, 50, 833-859.
- Goodpasture, J. C. (2015). *Project management the agile way*. 2<sup>nd</sup> edition. Plantation, FL: J. Ross Publishing.
- Hoffmann, L. (2015). Object lessons. *Communications of the ACM*, 58(3), March, 95-96.
- Hunter, J. (2012). How does the Deming management system fit with other management strategies: Interview by Bill Fox, part 2 of 3. Retrieved from <http://johnhunter.com/interviews/deming-management-system-fit.htm>, March 19, 2016.
- Jacobs, D. (2006). *Accelerating Process Improvement Using Agile Techniques*. New York, NY: Auerbach Publications.
- Johnstone, J. (2015). Agile quality: Software-development principles create more product value. *Quality Progress*, 48(7), July, 63.
- Kulak, D. (2011). What agile software development learned from Deming. Retrieved from <http://www.processexcellencenetwork.com/pex-tools-technologies/columns/agile-software-development-learns-from-dr-deming>, March 19, 2016.
- Lean Enterprise Institute (2013). What is Lean? Retrieved from [www.lean.org/whatslean/](http://www.lean.org/whatslean/), March 19, 2016.
- Liker, J. K. (2004). *The Toyota way*. New York, NY: McGraw-Hill.
- Meyer, D. (2005). Beneath the buzz: ITIL. Retrieved from <http://web.archive.org/web/20050404165524/http://www.cio.com/leadership/buzz/column.html?ID=4186>, March 19, 2016.
- Middleton, P., & Joyce, D. (2012). Lean software management: BBC worldwide case study. *IEEE Transactions on Engineering Management*, 59(1), 20-32.
- Miller, D. P. (2014a). Implementing Deming's theories in between process improvement efforts at public universities. *20th Annual International Deming Research Seminar*. New York, NY: The Deming Institute.
- Miller, D. P. (2014b). Transforming administrative services through a lean philosophy. *Educause Administrative IT Summit*. Chicago, IL: Educause.
- Ottenheimer, D. (2012). This day in history: Falklands war and ITIL. Retrieved from <http://www.flyingpenguin.com/?p=17113>, March 20, 2016.

Schur, M. (2015). The State of Agile. *PM Network*, 29(9), September, 16-17.

Shalloway, A. (2016). Introducing leanban: The 3<sup>rd</sup> generation of lean-agile for the team. Retrieved from [www.netobjectives.com/blogs/introducing-leanban-3rd-generation-lean-agile-team](http://www.netobjectives.com/blogs/introducing-leanban-3rd-generation-lean-agile-team), March 20, 2016.

Shalloway, A., Beaver, G., & Trott, J. (2010). *Lean-Agile software development: Achieving enterprise agility*. Boston, MA: Pearson Education.

Smith, S., & Sidky, H. (2009). *Becoming agile...in an imperfect world*. Greenwich, CT: Manning Publications Co.

Stavru, S. (2014). Critical examination of recent industrial surveys on agile. *The Journal of Systems and Software*, 94, 87-97.

VerizonOne.com. (2014), 8th Annual State of Agile Survey. Retrieved from <http://www.versionone.com/pdf/2013-state-of-agile-survey.pdf>, 27, 2015.

Webb, N. J., & Thoen, C. (2010). *The innovation playbook: A revolution in business excellence*. New York, NY: John Wiley and Sons.

Womack, J. P., Jones, D. T., & Roos, D. (1990). *The machine that changed the world*. New York: Rawson Associates.

Yousuf, A. (2009). Agile lessons from a management guru. Retrieved from <http://www.infoq.com/articles/deming-and-agile>, March 19, 2016.