Operational Excellence:
From Fragmented Vocation to Principle-Driven Profession

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Introduction

John Shook, succeeding Jim Womack as head of the Lean Enterprise Institute, asked in a recent newsletter what challenges are facing the lean community.

Fragmentation is the single biggest challenge facing the 'lean' community specifically and the larger community of practitioners pursuing impeccable quality, safety, efficiency and the like—TPS, six sigma, lean six sigma, TQM, re engineering, business process excellence.

Fragmentation is both unnecessary and counterproductive.

Fragmentation is Unnecessary

Fragmentation is unnecessary. Once one gets past the proprietary nomenclature of different camps, there is commonality in objective, commonality in path, and compliment in approach.

- The objective is exceptional performance.
- The path is high-speed, broad-based, relentless improvement.
- The approach is includes:
  - Designing complex systems of work so what is best known is built in,
  - Operating complex systems of work so problems are evident when and where they occur, and
  - Improving work systems—in ways both large and small—in a disciplined fashion, so that new, useful knowledge is regularly and reliably generated and deployed.

Common Objective: Excellence in Development, Design and Delivery to Create Competitive Advantage

Be it lean, six sigma, lean six sigma, business process excellence, re-engineering, or TPS, the common objective is creating substantial and sustainable competitive advantage by managing the internal operations of organizations—across the spectrum of development, design, and delivery—to create exceptional differentials in performance across the dimensions of quality, cost, reliability, responsiveness, security, and agility.[1]

Commonality Path to Greatness: Relentless Improvement and Innovation Leading to Exceptional Performance

Long-term industry leaders achieve exceptional levels of performance by creating and sustaining high velocity, broad-based, relentless improvement and internally generated innovation. In short, leadership goes to those able to 'discover their way to greatness.'[2]

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[1] The differentials in performance can be enormous. David Garvin demonstrated differentials in quality of up to 1,000 fold and more when comparing across similar manufacturing sites ("Quality on the Line," David Garvin, *Harvard Business Review*, September-October 1983). John Krafcik reported two-fold differentials in productivity—twice the output by half the people, in half the space, with half the equipment and material on hand ("Triumph of the Lean Production System," John Krafcik, *Sloan Management Review*, Fall 1988). Clark and Fujimoto discovered substantial differences in the efficiency and efficacy of new product design teams, measured by lead time, engineering productivity, and total product quality (*Product Development Performance: Strategy, Organization, and Management in the World Auto Industry*, 1991). These extraordinary differentials are not limited just to design and production in manufacturing. Quality, affordability, and availability can all be increased by large multiples and even orders of magnitude in healthcare and other services.

[2] For instance, the trajectory for Toyota's improvement trajectory, from also run automaker in the late 1950s to on par for productivity by the early '60s, to world leadership by productivity and quality by the late '60s (a 10-year dash from worst to best) is documented by Cusumano ("Manufacturing Innovation: Lessons from the Japanese Auto Industry," *Sloan Management Review*, Sept. 1988) and others. More recently, we've seen Apple establish itself as a leader in consumer electronics by its ability to introduce new technology, formats, functionality, and uses ahead of and with faster update cycles than rivals.

Commonality in Approach

Third is commonality and compliment in approach towards generating high velocity, broad based, relentless improvement and innovation.

Design Work to Capture Best Known Approach

Characteristic of the world's most operationally competitive organizations is a commitment to specifying—in advance of doing work—how work is expected to proceed, both by method and outcome. This accomplishes two goals. It makes for an explicit incorporation of what is already known about achieving success. It also creates the opportunity to see problems—abnormalities—because they stand out in contrast to the specified expectations.

This idea, of specifying work design (i.e., expectations) in advance of doing work (i.e., reality) has long roots. Skinner (1974)[3] observed that managing individual islands of technological specialization—a job shop approach with work moving from one location to another on a first come, first served (for shops) first available (for 'servers') basis was sub optimal, leading to confusion, congestion, and diminished repetitive learning. In contrast, he advocated for 'focused factories within the factory,' with pre demarcated lining up of people and equipment for jobs of similar types, with jobs needing work done in a different sequence following a separate, pre demarcated flow. Congestion would go down by ease of line balancing, confusion would decrease as people could manage their particular responsibilities cognizant of what worked preceded them and what would follow, and the focus would allow learning as people mastered their individual roles and how those roles related to what came before and after.

Hammer and Champy extended Skinner's logic from within the factory walls to across the enterprise as a whole. Responding to the increasing complexity of mission critical business processes—ever more specialties needed to create and deliver value, the railed against a traditional approach of managing functions within stove piped departments, hoping that the individual components would happily integrate into a coherent system on their own. Instead, they counseled for 're-engineering' the corporation, to

[3] Skinner, Wickham, "The Focused Factory," *Harvard Business Review*, 1974.

manage individual functions in service to end-to-end processes.[4] Of course, the lean movement pulled continuous flow and value stream maps from the 'focused factory within the factory' like approach reported at Toyota and its best suppliers.[5]

The same logic—that you can succeed more consistently by specifying in advance of doing work how to proceed—is at the heart of Talyor's scientific management[6] and the multiplicity of 'lean' tools like standard work, 5S, and production cells.

See Problems When and Where They Occur

Problems have to be seen when and where they occur so they can be solved reliably. This theme too spans the boundaries separating one camp from another.

Edwards Deming—operating in an environment of high volume, repeatable manufacturing—advocated statistical methods to distinguish normal variation in a process from bona fide process drift that was the result of abnormalities.[7] Sakichi Toyoda, founder of the Toyota empire, built his reputation and early fortune on the concept of 'jidoka.' Though loosely and nebulously translated as 'automation with a human touch,' Toyoda was pushing the point that work should stop and call attention when and where problems occurred. At first, this concept was specific to looms, getting them to stop weaving when threads broke, but it later became a general concept to the design of any equipment and the work methods around it.[8] Though

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[4] Hammer and Champy, *Re-engineering the Corporation*: *A Manifesto for Corporate Change*, 1993.

[5] Womack, Jones, and Roos, *The Machine That Changed the World*, 1990

[6] Taylor, Frederick W., *The Principles of Scientific Management*, 1911.

[7] Deming, W Edwards, *Out of the Crisis*, MIT Press 1982, "Improvement of quality and productivity through action by management," *National Productivity Review*, 1981.

[8] In fact, 'jidoka' is so essential to the essence of TPS, that the Toyoda family museum's centerpiece is a loom built by Mr. Toyoda which does not have the capacity to stop running when a thread breaks. Why this as a testament to his inventive and entrepreneurial skill? Because he refused to build a second loom of the same type until figuring out how to get jidoka into the first. It is not the loom

'jidoka,' as a general concept, hasn't been popularized within the lean world, there is at least some use of error-catching tools (e.g. poka yoke).

Solve Problems with Discipline

PDCA, Shewhart cycle, Deming Cycle, Design Measure Analyze Improve Control (DMAIC), and A3. Different terms, implying different approaches, but all encouraging the same thing: engaging the scientific method to solve problems.

Why? At the root cause of any problem is ignorance—an incompleteness or inaccuracy in understanding what actions will lead to what outcomes. The only true countermeasure to ignorance is learning, and the evidence is that learning is accelerated when done in a disciplined fashion.

The scientific method has inductive and deductive elements to building knowledge. Inductive is the observation, categorization and other 'sense making' towards generating a hypothesis of what causes what else. Deductive is the controlled experiment to see if the hypothesis holds in practice.

The A3 problem solving document, when used properly has elements. On the inductive side are the observations leading to the construction of a 'current condition,' the investigation of root causes, and construction of a 'theory of failure.' The deductive side includes developing counter measures, predicting their effect as a 'target condition,' and following up to ensure the actual outcome matches the prediction.

DMAIC, when well done has similar inductive and deductive attributes. Inductive is defining, measuring, and analyzing a situation. The deductive is the improvement and control.

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that is really being exhibited, it is the discipline to adhere to the design principle, not to build a second machine until the first was self regulating.

Fragmentation is Counterproductive

Fragmentation across various camps pursuing operational excellence is not only unnecessary by the commonality of objectives and approaches, it is terribly counterproductive.

With fragmented approaches, people become vocational experts—skillful with the tools and applications of their trade, but otherwise marginalized from the more professional disciplines of the organization. What characterizes a profession? Grounding in basic principles that guide research, teaching, and practice. Engineering emerged from the craft of mechanics with the science of structures, dynamics, systems, and the like. Medicine emerged from a trade status with deeper grounding in the basic science of chemistry, physics, and biology, and the newer sciences of genetics and so forth. Finance emerged as a profession, built on the foundational concepts of option pricing, portfolio theory, and net present value.

Disciplines do have their trade/vocational counterparts—radiology technicians to run imaging equipment for radiologists, respiratory therapists to treat pulmonologists' patients, mechanics to fix what engineers have designed. However, it is the professional disciplines that have sway, influence, and status in organizations, with the vocations in a supporting role.

So too, operational excellence. With focus and emphasis on tools—"I've proven my lean credentials by doing value stream maps, waste elimination, and kaizen blitzes to introduce standard work," "I've proven my six sigma credentials earning a green or black belt with a DMAIC exercise,"—the vocational expert in designing, operating, and improving systems are marginalized. They're the 'tech' who gets called in to fix something broken but who is not part of the organization's strategic thinking.

In contrast, there are a very few organizations who recognize that there is a 'basic science' to guide the design, operation, and improvement of complex systems of work just as there are 'basic sciences' to guide the design of bridges, buildings, and aircraft, and as there are basic sciences to guide the design of treatment plans of sick patients. In those rare cases, the systems/operations expert carries sway and influence commensurate with the other professions in the organization, in the thick of matching how work

is going to get done and get done better every day with the strategy thinking of what work to do on behalf of what markets.

Conclusion

Lean manufacturing, six sigma, business process excellence, re engineering, TQM, etc. have defaulted into vocational status—trades people, practicing a craft, mastering applications of the tools they use. This fragmentation obscures the 'basic science of systems' by which excellence is achieved across the span of development, design, and production. As a result, operational excellence is marginalized within organizations, is not taught in business schools, and so is not part of most organizations competitive arsenal.

The solution is building out common themes of specification in design, problem identification in operation, and scientific method in problem solving. These themes can be taught as basic principles, exercised across application and expressed with tools and techniques, used appropriately and not ritualistically.