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# Pharma's Tenuous Commitment to Lean

By Bikash Chatterjee, President and CTO, Pharmatech Associates

There is an old saying that “change is inevitable… adapting to change is unavoidable; it's how you do it that sets you together or apart.”[1] Looking closely at how we have developed products, defined quality assurance and demonstrated regulatory compliance, the last five years have been remarkable in terms of coping with change. We have seen more paradigm shifts than we have encountered in decades. It can be argued that this transient state was inevitable. Weighed down by bureaucratic regulatory and compliance philosophies and mired in a mindset preoccupied with deviation and exception management rather than consistency and stability, Pharma's insular market structure has led us to promote our own bad habits.

Consequently, the charge toward parity in the global marketplace by the emerging markets caught us unaware. Challenged by markets that could provide cheap labor and low-cost capital infrastructure, we had to find ways to improve our productivity and effectiveness. As an industry, we looked to Operational Excellence initiatives such as Six Sigma [2] and Lean Manufacturing for a roadmap to increased business performance. Of these, Six Sigma has had limited success in terms of broad industry adoption. With its focus on identifying and eliminating sources of variation within a given process, Six Sigma requires significant organizational participation to be truly effective. In addition, the timelines for typical Green Belt and Black Belt Six Sigma projects are often longer than organizations are willing to invest in. With its prospect of rapid and easily realizable productivity improvements, it is Lean manufacturing that offers the most promise. Unlike Six Sigma, Lean does not require sophisticated statistical knowledge to be effective. Lean, when properly applied, focuses upon executing a process the best way possible, based on what the market demands.

Given Pharma's history of low-efficiency manufacturing, we were ripe for Lean. Through the judicious application of Lean Kaizens we could quickly realize productivity gains on the factory floor which translated to lower cost of goods.

Big Pharma was the first to embrace this opportunity, as they were under the greatest pressure to perform for shareholders and customers. Generic manufacturers and mid-tier companies have been cautious to embrace Lean, either because of management's unfamiliarity with its benefits, or a general focus on short-term bottom line results instead of long-term business performance.

Yet, in looking across the industry, I see several areas where the principles of Lean manufacturing have been able to gain a foothold and impact our ability to be competitive.

**Clinical Supply Chain**
Often overlooked in the drug development lifecycle, the clinical supply chain has commonly been considered a stumbling block, that is, a process to be endured when moving products into clinical evaluation. It is not unusual for clinical supply chains to require 16 weeks or more to get product into the hands of investigators. Not to mention the mixed results sometimes obtained due to systems being expedited for the sake of schedule. Big Pharma recognized that huge efficiencies could be achieved by applying the basic principles of standardized work practices to the format and number of clinical presentations. Standardizing such work practices allows earlier protocol submission for IRB approval and earlier establishment of the IVRS database.

Through Lean, best-in-class Pharma has taken global pivotal clinical trial supply timelines from 16-24 weeks down to four to six weeks and dropped the number of mistakes made by 50 percent or more[3]. This has not only increased efficiency but also driven down risk in data acquisition within the clinical program phase.

**Analytical Testing**
Historically, testing is managed based upon market need, resulting in a routine environment of chaos and expedited programs. Herein lies the “Lean paradox.” Perpetually under the gun to do more with less, laboratories have become one of the most significant Lean success stories within our industry.

Because the ultimate goal of Lean is to create continuous flow throughout the process, we use techniques such as Value Stream Mapping (VSM) and 5S to identify opportunities for efficiency gains. Laboratory operations using a Lean approach have adopted a similar recipe for success. First, the basic lab layout is optimized-using VSM, the Visual Workplace and 5S-to create a stable and predictable work environment. Then, the operation of the laboratory is managed very similarly to a Lean manufacturing operation, by controlling process velocity. In this case, it means managing assay velocity through the lab, by analyst. In Lean we call this **leveling production** or *Heijunka*. Coupled with information infrastructure such as LIMS and electronic document control, testing cycle times have dropped from 6-8 weeks to literally four to five days in this new optimized environment. When plugged back into the total product value stream, heijunka gives the organization tremendous elasticity in its response to business fluctuations, without building excessive inventories or incurring back-order situations, another key principle of Lean.

**Product Development**
There is no doubt that manufacturing executives face increasing competitive pressure to improve shop floor performance and supply chain management. However, when one evaluates the key components of our industry's development lifecycle, the greatest potential business impact from improvement lies in product development. Lean development in Pharma means taking on the three critical facets of product development: Speed to Market, Production Cost and Market Price (Figure 1). Within Lean product development the tools required to optimize each of these different elements vary.

When considering production cost, several techniques have demonstrated their effectiveness within Pharma. The basic principles of Design for Six Sigma have moved manufacturing considerations early into the product design and development process. Similarly, their application has introduced more objective screening criteria into the drug

discovery process for molecule and therapy development. When potentially unsuccessful drugs can be dropped earlier in the cycle, development costs and resource demands can be reduced significantly.

Several Big Pharma companies have begun adapting the basic principles of the Toyota Product Development system to the Pharma paradigm. This approach encourages parallel product development and encouraging the establishment of a platform-type solution. For example, one approach would be to move toward a standard approach to developing immediate release tablet therapies, using similar excipients in a direct blend or granulation processes. This allows for a more thorough characterization activity in development and tech transfer and a higher efficiency manufacturing operation downstream, because of the common platform.

In terms of speed to market, classical Lean tools such as VSM can remove redundant processes. Finally, the trade-off decision required to satisfy the marketplace's performance and pricing requirements can leverage classical quality design techniques-such as Quality Functional Deployment (QFD)-to balance the cost performance paradigm.

Attractive because of its ability to rapidly realize efficiency gains, there is no doubt that Lean has had an impact. Yet, many Pharma companies may have soured on the true long-term benefits of Lean, citing less-than-expected benefits from limited improvement initiatives. As with all fundamental changes in business, top-down consistency and support will dictate the final success. Within our industry we are still struggling with reconciling the major changes in product development and compliance philosophy put forth by the FDA and EMEA. In spite of everything, organizations that have made the commitment are realizing Lean's substantial benefits. If the emerging markets-hungry as they are for parity and recognition in the global marketplace-can make the leap to Lean there is no doubt they will be a force to be reckoned with. And the future will belong to organizations that can embrace change most completely.

References:

[1] William Ngwako Maphoto

[2] Six Sigma is a Trademark of the Motorola Company

[3]Based upon Pharmatech Associates specific program implementations