

Proof of Process as Leading Indicators: Base For Lean Metrics

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In his book “*Selecting the Right Manufacturing Improvement Tools*”, Ron Moore introduces the idea that many of the traditional measurements in use by companies measure business activity after the fact. He calls them “lagging indicators” such as unit cost of production, return on net assets or gross profit per product line. Moore does not suggest there is anything wrong with these measures. In fact they are designed to be simply an after the fact confirmation that the right things are happening in the company according to expectations. He does suggest that we also need leading indicators to assure we are doing the right things for results. Peter Drucker also discusses information “Executives Truly Need” to direct company strategy: return on Investment, Economic Value Added and the objective of all business activity: results. To get to the expected outcome, these metrics bank on the right things being done day to day but they are not designed to measure the work being done day to day. Nor are the lagging indicators designed to insure that anything different is going to happen for the company in the next reporting period. When used alone, lagging indicators are only expectations as to the performance outcome between this month and next or this quarter and next. When relying solely on the lagging indicators, management can never be sure of the operations and financial results until the books are closed for the next month and the “horse is still out of the barn”. Such measures used in a traditional systems setting were not available for sometimes weeks after month-end closing. Even today when the books can be “closed” the second day after month-end, the next lagging metrics will not be known for another thirty days.

Metrics in Traditional Silos

In addition to lagging the activity they were designed to measure, many traditional metrics are ineffective because they attempt to establish local optimums which create conflicts and confusion in organizational behavior. As Hall and Huntzinger point out in the fourth issue, 2007 of *Target*, such metrics as headcount reduction in a kaizen event stops the lean spirit among the workers; the “conundrum” established by maximizing current assets by delaying accounts payable; or measures such as improved quality and reduced costs set up “contradictions” in organizational behavior. Other metrics such as on time shipments often are not even defined as to when the countdown starts.

What is missing in identifying the useful metrics for lean is the realization that the traditional metrics measure traditional operations. If the traditional processes were full of wasteful transactions, redundant process steps and excess time, then the metrics which measured them could be no less wasteful and ineffective. On the way to lean, such measures must therefore go through the same evaluation, transformation or elimination that the traditional operational processes go through. And most important of all, many such metrics cannot be carried over and applied to a lean environment. Most times, they just don’t fit.

As Hall and Huntzinger point out, “ Effective performance measures let us take corrective action.... If they don’t convey anything actionable, ever, they [too] are waste.”

The metrics for lean must therefore reflect the actions of lean and the learning system that is the foundation of lean. As the traditional operational processes undergo a transformation to lean, so must the traditional metrics. It’s not easy changing a lifetime of thinking.

Proof of Process - Leading Indicators

A company starting on the lifetime lean journey uses many tools and projects in the transformation and often without considering how the results will be measured. Companies soon learn that lean activities across the enterprise are expected to occur hour by hour, day by day in compressing time and space, in reducing waste and producing results. The results are likely measured by traditional, lagging indicators. Since lagging indicators measure after the fact activities in anticipation of success, then what are the ongoing measures of lean and how do companies manage the tools as leading indicators and predictors of success? The answer is found in *Proving the Process* as companies learn how to manage the activity of lean in the ongoing, hour to hour work of the enterprise.

Proof of Process is the observable, ongoing work and improvement *activity at the workplace facilitated by visual systems*. Such hourly activity as operators recording ongoing production against takt time; receiving personnel recording incoming material status against kanban release; or kaizen activities recorded at the place of improvement is the *Proof of the Lean Process*. Proof of process that occurs throughout the workplace is the indicator that learning is going on and that improvements are happening.

For example, the *Proof of Process* for the kaizen event facilitates the collection of data, facilitates the analysis and shows the results of improvements. The record is real time, part of the improvement work and validation that standard work and improvements are a part of the daily business process. Lagging summary data may be a necessary metric for managers and could be as simple as number of kaizen projects this week, usable square footage saved or reduction in cycle time. The square footage saved at so many dollars is the predictor of the use of the new space from later process improvement activities. The management metrics occur later in time as appropriate period summaries of results are based entirely on the lean activities and reporting on the work already done.

Leading to Results – Managing the Metrics

The management practice of developing systems to summarize data, track progress and check status of human activity is a requirement for doing business and is the way of recording results and keeping score even though by definition lags the actual work. If the tools of lean and their Proof of Process are the leading indicators of lean results, then the metrics management chooses summarize and show the status of those lean activities. The (lagging) management metrics are required but should not be allowed to become a hindrance and an addition to waste as multilevel, bureaucratic, complex reporting systems.

The activities in a lean environment are managed at two levels.

Reporting by Traditional Metrics

1. Tracking specific project improvements – Management approved projects- some requiring capital outlays. Any project from company acquisitions to capital improvements requires a management documentation
2. Tracking weekly short term activity improvements – Ongoing daily improvements occurring from the office or shop floor require some summary documentation of after the fact results
3. Monthly financial reporting for operational and legal objectives

Proof of Process – The Lean Activities

4. Recording hourly production at the associate workplace – Shows production or work activity to takt time and identifies the need for improvements to standard work deviations
5. Hoshin room projects – Ongoing visual display of the status of improvement projects at the work site
6. Gemba walks – Any member of the organization verifying process status by visiting the work place
7. Shift start up meetings – Associates and supervisors managing for results
8. All visual systems and displays are current and facilitate lean objectives
9. Recording all improvement activity as it occurs – Verifiable on Gemba walks
10. Conformance by operator machine care tasks, c.g. tighten, lubricate, clean
11. Conformance to process control standards and number of deviations
12. Daily preventive maintenance compliance

The reader will recall that the traditional factory also recorded such data as labor efficiency, material movement for inventory locations and requisitions for tools and many more. In the traditional factory, those records generally were compiled for a system and for later use by some other staff member and not by the person recording and initiating the data. The lean workplace changed that. Not only are the tools of the lean company directed to the lean definition of waste, they are directed at engaging all associates in the pursuit of waste so that the records and transactions they maintain facilitates doing the work and creating new knowledge. In a lean environment the management walk around is not just to view parts being made but to see this proof of the lean process – the leading indicators of lean results.

Table1 shows selected examples of the summary lean metrics management may wish to report and track on the progress of lean results. Financial and cost reporting are also considerations but many traditional measures will still be used but some may be discarded.

Table 1 – Selected Lean Metrics

Steering committee project management - A leadership management vehicle
Top management participation in projects - A leadership management vehicle
Improvement projects completed or cancelled - All projects recorded – few cancelled
Set up reduction improvements - Reducing batch and getting to flow
Number of work cells developed - Reducing batch and getting to flow
Reducing batch sizes and producing to takt time - Eliminating overproduction
Eliminating parts stockrooms - Eliminating waste – manufacture what is needed
Replenishing inventory systems from visual systems - Eliminating waste
Create level pull - Getting to flow
Improvement in quality - Requirement for lean
Training schedule for all employees in lean - Requirement for lean – tapping creativity
Reduction in cycle time of just about everything - Requirement for lean
Standard work - Requirement for lea improvement base

The company progress toward a visual enterprise - Engaging all employees in improvement
Improvement in market share through lean - Results of lean
Time to market from design to launch - Engineering improvement
Total Productive Maintenance - Equipment must be predictable and effective
Cash on hand - Indicator of inventory reduction
Target costing - A tool for improving product design and manufacturing cost

Periodic assessments and self audits of lean activities also can be useful as a longer term evaluation of the nuts and bolts of the lean activities. Several hundred line items of activity each with a rating scale are generally included in the audit. The audit provides a detailed examination of the detailed lean activities with evaluation ratings of work going on. The audit may also reveal where work has not started and can provide input to the next level for improvement. Audits and assessments are also lagging indicators of the success of the lean process.

Lean Tools Interconnected

Companies starting to implement lean have been put off from expected results of some early projects for lack of return on investment. Without some metrics for lean and the understanding of the time it takes to turn around a traditional culture, many companies starting into lean use traditional measures and assume that for each successful stand alone lean project, there is a corresponding savings that drops to the P&L the next two or three months. Or else they conclude that lean must not work. Some companies even select the improvement projects based only on pure, stand alone return on investment (ROI).

For example, performing equipment change-over projects that lead to breaking the logjam of batch production may not yield an ROI immediately. When the batches have been reduced because of improved equipment changeover time and parts stockrooms have been eliminated, inventory levels fall dramatically. Even then the P&L takes an initial negative hit from the charge to operations of the deferred labor and overhead inventory costs stored from past periods. It is at that point that management must look for the lean transformation and the associated costs of material handling and movement in the factory. Some financial analysts still look only to the lagging P&L indicator when paying attention to the leading indicators of batch size reduction, set-up reduction, cash position increases and reduced inventories is the proof of the lean process to follow. Return on investment does follow, but it takes time for the results of the lean tools to connect to the total value stream. It is not a matter that each silo project will kick in and affect the total measurable workflow somewhere in the middle of the operation. Shifting management thinking and the traditional metrics to a focus on the lean process can smooth the transition from batch to lean.

“ The key to the Toyota Way and what makes Toyota stand out is not any of the individual elements.... But what is important is having all the elements together. It must be practiced every day in a very consistent manner-not spurts.”

Fujio Cho, Chairman Toyota Motor Corporation, AME National Conference, 2004

Summary

As work practices have changed to lean from traditional manufacturing, administration, health care or other operations, the way lean companies think about measuring results has also changed.

1. Traditional measures must be challenged for correction or elimination. Some traditional metrics should not be applied to the lean environment and are obsolete but other traditional metrics (ROI,

inventory turns) are expected to show positive results when the Proof of the Process is at work and verifiable.

2. A system of performance measures is inseparable from the beliefs and competence of organizational leadership according to Hall and Huntzinger. Leaders must spend the time to understand the enterprise wide ramifications of lean and not leave lean in the toolbox.

3. The hour to hour work of lean and the tools in use at the workplace are the focus for assessing the lean process as predictors of business results.

4. Both traditional metrics and lean metrics are after the fact, lagging results indicators and are dependent on the hour to hour, lean workplace practices.

5. Management reporting for lean metrics is a direct reflection of the lean processes completed at the workplace and are the so called 'metrics of lean'.

Gemba walks and visual systems are well documented practices of lean practitioners and provide proof of the process that the lean work is being done. If the right things are done positive results will follow.

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