

Creating a Long-Lasting Lean Six Sigma Deployment

Organizations have achieved success by using lean and Six Sigma tools to improve processes. Leadership, however, isn't always appreciative of these enhancement efforts. Executives might ask the question, "Where is the \$100 million that the lean Six Sigma function reportedly saved?" Because of this lack of leadership-perceived benefit, organizational improvement functions are eventually downsized or eliminated.

For long-lasting success, lean Six Sigma organizations must do more than just state monetary savings. They also must show through time-series statistical charts how key performance metrics were improved through process-enhancement efforts and how these improvements positively affected the entire business.

Selecting projects aligned to business performance metrics

The last nine words of Wikipedia's definition for operational excellence (OE) are important: "Tools toward



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the sustainable improvement of key performance metrics."¹ Organizations benefit when they have a system that addresses the definition's final words.

For this to occur, however, OE and lean Six Sigma organizations and practitioners must initially focus on determining what key performance metrics must be improved, and statistically show in a graphical time-series format how the metric was enhanced through their efforts.

Tracking key performance metrics from a process point of view

From Wikipedia's OE definition, organizational focus on improving business processes must target the demonstration of improvements to key performance metrics. This is difficult, if not impossible to accomplish using traditional key performance metric reporting. Traditional scorecards do not provide a scorecard statement from a process-output-response point of view.

Examples of nonprocess output report formats are:

- Red-yellow-green scorecard reporting in which a red-colored metric indicates that action should be taken because a performance-metric goal is not being met.
- Tables of numbers that lead to confusion and interpretation inconsistencies.
- Stacked bar charts (for example, comparing monthly measurements).
- Excel sheets that show "the numbers" that have a first-of-the-year initiation.
- A time-series chart that does not provide actionable and nonactionable insight.

Variability occurs in processes. Traditional forms of reporting, however, do not include this important process-variation aspect relative to assessing how a process output is performing relative to organizational and customer needs. Whether the magnitude of process variability is large or small, process variation should be involved in deciding whether to improve a process.

In addition, traditional scorecards only reflect historical individualized data points in which individual

value comparisons might be made. For example, metric comparisons are quarter-to-quarter or last month to similar month from last year—that is, November 2016 compared to November 2015. What is desired is a futuristic process statement that says if future anticipation is unsatisfactory, process enhancements are needed to make the output response more desirable.

If scorecards are not properly set up and reported from a process point of view and transparently available for those authorized throughout the organization for timely evaluation, problems not unlike those encountered by Wells Fargo can occur:

The “Independent Directors of the Board of Wells Fargo & Co. Sales Practices Investigation Report”²² stated, as noted below, how a managerial tactic was “managing to the scorecard,” which can lead to unhealthy, if not destructive, behaviors.

“Certain managers made meeting scorecard requirements their sole objective, a tactic referred to as ‘managing to the scorecard.’ As a result, employees reporting to these managers were consistently pressured to meet scorecard goals.”

One regional bank-wide rankings and campaigns included sales activities with one specific campaign

named “Jump Into January.”

“Regional bank-wide sales campaigns—most significantly, the ‘Jump Into January’ campaign—were also closely associated with increasing misconduct over time. ‘Jump Into January,’ created in 2003, aimed to motivate employees to ‘start the New Year strong by achieving and exceeding January goals.’”²³

An Integrated Enterprise Excellence (IEE) 30,000-foot-level report-out⁴⁻¹³ is a one-page pictorial process-out description that overcomes traditional-scorecard issues. With automatic updating, this form of reporting also can provide transparency to eliminate any temptation to adjust the numbers to make them appear more favorable for monthly or quarterly executive performance reports.

An IEE 30,000-foot-level view provides a:

- Baseline that assesses process stability, which can be created so there is consistency with the frequency of current key performance metric report-outs.
- Consistent, easy-to-understand process capability statement, even when no specification exists.
- Process report-out method so there is consistency and transparency in measurement reporting for attribute and continuous response data that uses

Figure 1. **Enterprise improvement plan**

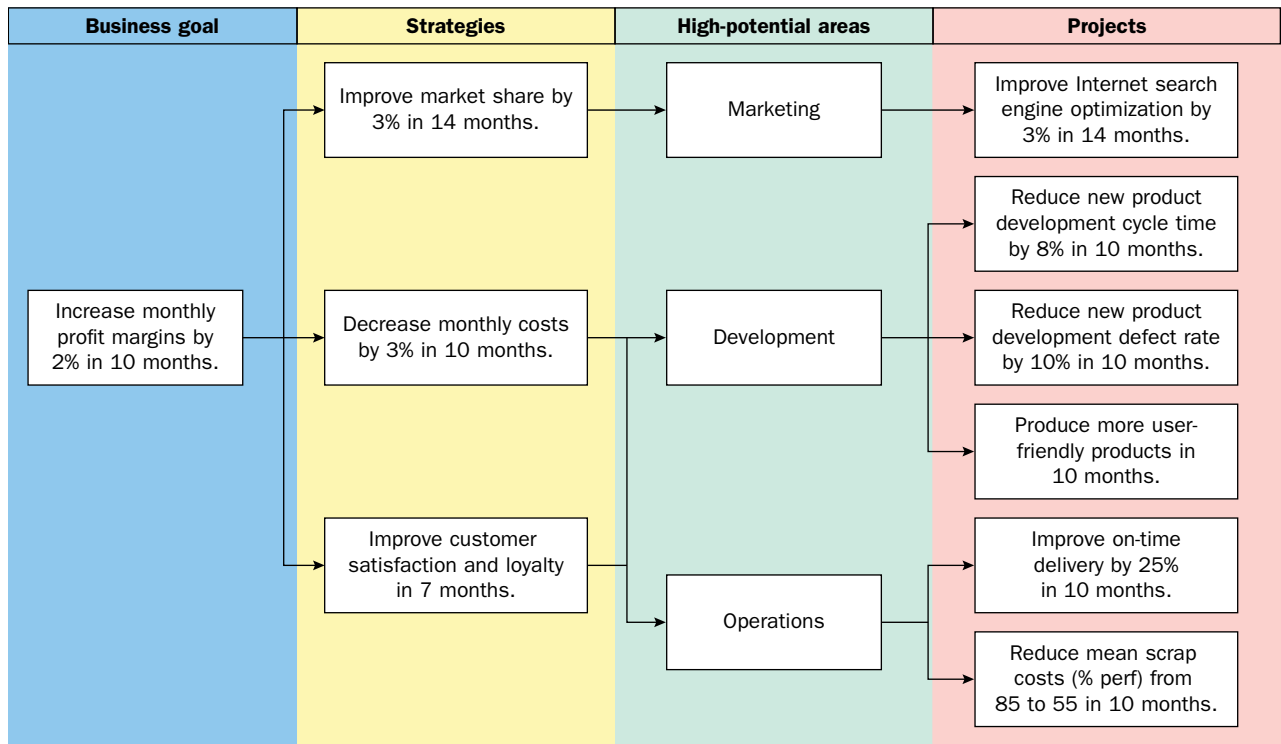
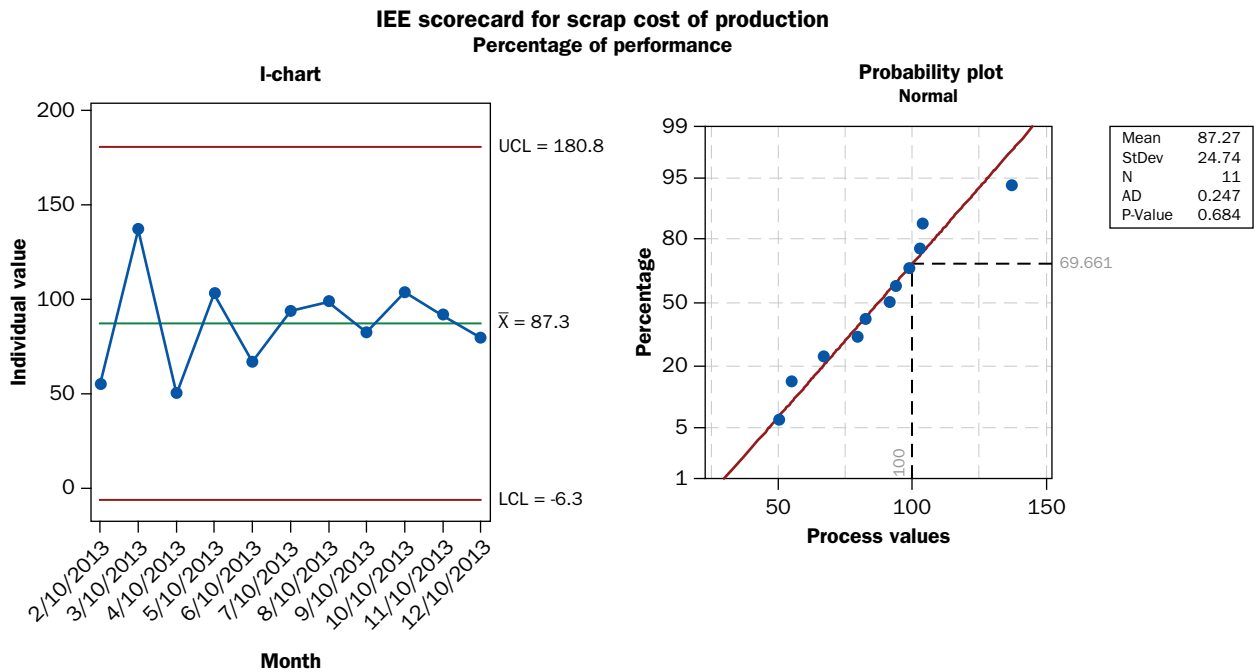


Figure 2. **Red-yellow-green scorecard for scrap costs**

	Feb. 2013	March 2013	April 2013	May 2013	June 2013	July 2013	Aug. 2013	Sept. 2013	Oct. 2013	Nov. 2013	Dec. 2013
Key KPIs	Perf. %	Perf. %	Perf. %	Perf. %	Perf. %	Perf. %	Perf. %	Perf. %	Perf. %	Perf. %	Perf. %
ABC scrap costs of production	55	137	50	103	67	94	99	82	104	91	79

KPI = key performance indicator

Figure 3. **IEE 30,000-foot-level report-out with 100% as upper specification**



The current process is predictable.
The estimated non-conformance rate is 30.338%.
IEE = Integrated Enterprise Excellence

the same terminology.

- Mechanism for determining how long a process has been stable—for example, three days, three months or three years.
- Futuristic process output performance expectations, when appropriate, in words that everyone can easily understand.
- Prediction statement of what can be expected from the process unless something occurred differently in the process—either through degradation or enhancements.
- Potential metric improvement opportunity that pulls for use of the most beneficial lean or Six Sigma improvement tools so a measurement performance is enhanced.
- Control report-out to maintain improvement

gains, which can automatically be updated and reported if desired.

- Demonstration in visual and analytical terms that a process was improved through an improvement effort (for example, lean or Six Sigma) with the quantification of performance benefits in terms that everyone understands.
- Process improvement focus at the 30,000-foot organizational level.

Evaluating, improving a KPI from a process point of view

Consider that an organization created the enterprise improvement plan (EIP)¹⁴ shown in Figure 1.

With an EIP visual representation, you can see how

process enhancement efforts are aligned to key performance indicator (KPI) improvement needs in which there is an owner of this metric's performance and the entire business can benefit from the effort to improve processes.

When a strategic metric is not performing as well as desired, this IEE 30,000-foot-level report-out can create a pull for process-enhancement efforts. The owner of a strategic metric to be improved should have a sense of urgency for timely completion of an improvement to the process when he or she, for example, must regularly update (monthly, for example) an executive of the metric's improvement status.

Improving KPIs and illustrating benefits

A company-provided, red-yellow-green scorecard will be used to illustrate the application of the IEE EIP and 30,000-foot-level reporting and improvement techniques.

Figure 2 (p. 7) shows a traditional red-yellow-green scorecard for an organization's scrap-cost metric.

In this chart, red indicates that an organizational goal of 100% was not being achieved and action should

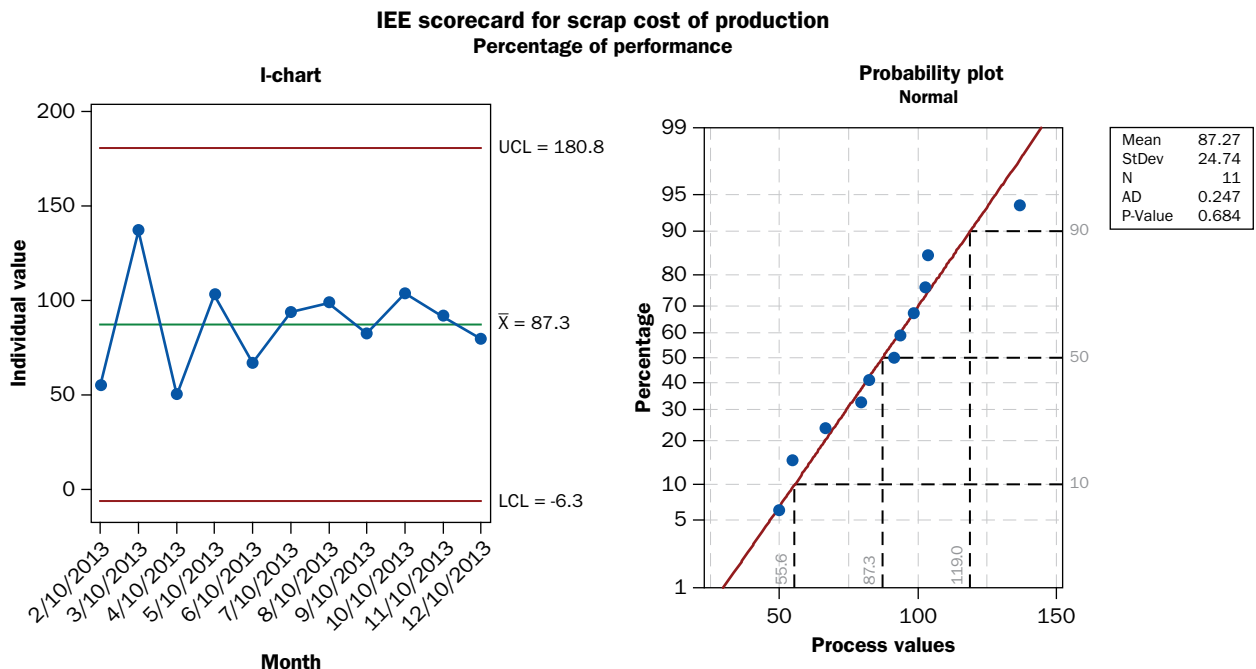
be taken to resolve the lack-of-performance issue. The green color indicates that the managerial objective is being met. With a red to green transition, management is usually pleased because typically there is the belief that any red-to-green color transition means that the red-colored shortcoming from the previous time period was resolved.

A 30,000-foot-level report-out¹⁵ of this data, in which 100% is set as an upper specification limit, would result in Figure 3 (p. 7).

The individuals chart (I-chart) in Figure 3 indicates that the process is stable and has not changed over time. This conclusion is quite different from the inference that you would typically make from the stoplight scorecard plot in Figure 2.

In addition, because the process is stable from a 30,000-foot-level point of view, the current data can be considered a random sample for future response projections. The probability plot in Figure 3 uses data from the recent region of stability to provide a population-best-estimate prediction of not only how the process is currently performing, but also expectation of future performance. For this illustration, about 30% of the reported months are expected to be above

Figure 4. **IEE 30,000-foot-level report-out with mean and 80% frequency of occurrence estimates**



The current process is predictable.
 The estimated mean is 87.266 with 80% of the events between 55.559 and 118.97.
 IEE = Integrated Enterprise Excellence

WITH A RED TO GREEN TRANSITION, MANAGEMENT IS USUALLY PLEASED BECAUSE TYPICALLY THERE IS THE BELIEF THAT ANY RED-GREEN COLOR TRANSITION MEANS THAT THE RED-COLORED SHORTCOMING FROM THE PREVIOUS TIME PERIOD WAS RESOLVED.

100%. A 30,000-foot-level report-out provides a best-estimate prediction statement, when appropriate, at the bottom of the chart.

KPIs goal assessment and 30,000-foot-level report-outs

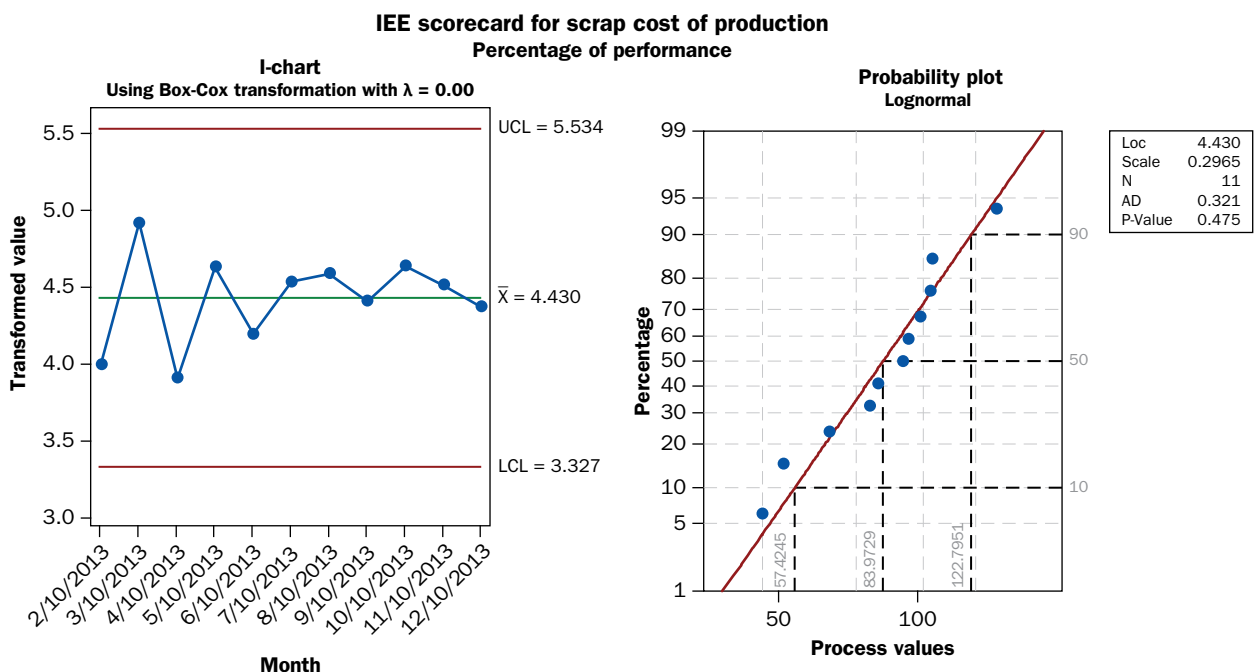
In this company example, a scrap goal was set for each month and how well this goal was being achieved was monitored. From a process point of view, however, a better target for this particular metric probability would have been mean monthly cost and month-to-month variation from this metric mean. The reason for this goal transition is that a 100% target value is not an actual specification.

Figure 4 illustrates an IEE 30,000-foot-level report-

out given this set of conditions in which a mean response is reported and common-cause variability is reported as 80% frequency of occurrence for the monthly-reported values. This 80% frequency rate is determined from the probability plot's 90% and 10% values—that is, 90% - 10% = 80%. In other words, from this report-out, you expect the process to produce (from a common-cause variability point of view) a mean response of about 87.3—with four out of five monthly responses between 55.6 and 119.

From the I-chart plot shown in Figure 4, you see that zero is within the individuals-plot control limits. For this metric, values below zero are not physically possible. An I-chart is not robust to data non-normality; hence, a transformation that makes physical sense may be appropriate when creating this high-level

Figure 5. IEE 30,000-foot-level report-out with mean and 80% frequency of occurrence for futuristic population estimates

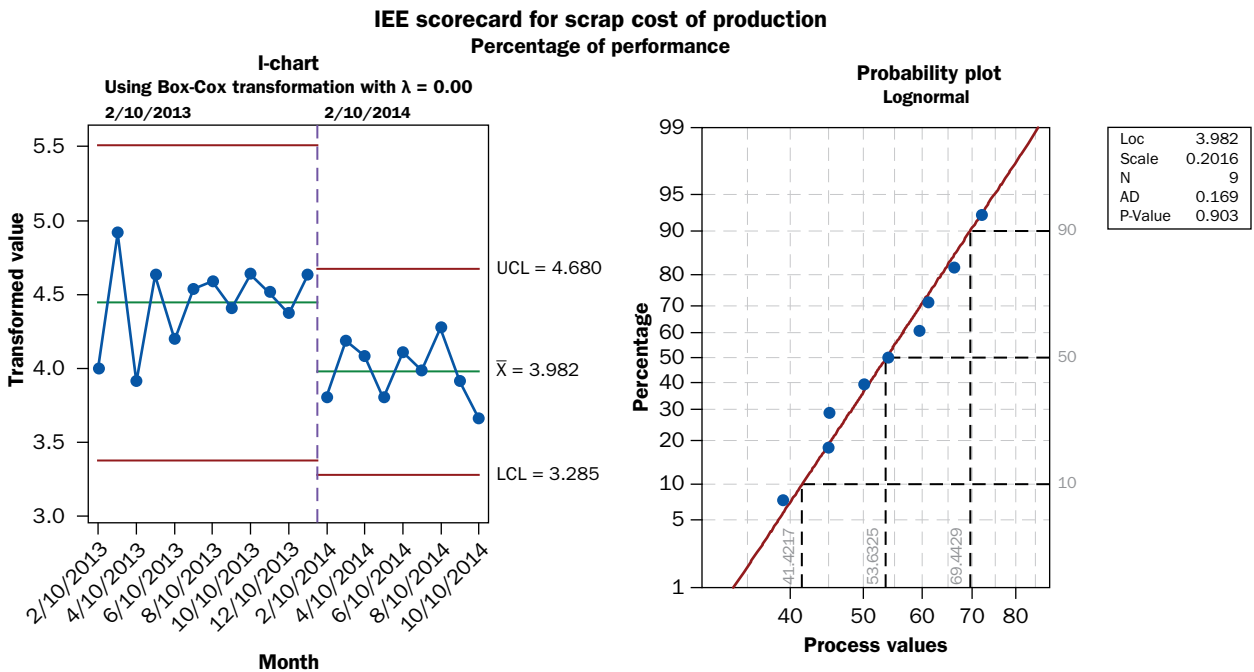


The current process is predictable.

The estimated mean is 87.266 with 80% of the events between 57.424 and 122.79.

IEE = Integrated Enterprise Excellence

Figure 6. **IEE 30,000-foot-level report-out with mean and 80% frequency of occurrence for futuristic population estimates (new process KPI began 2/10/2014)**



The current process is predictable.
 The estimated mean is 54.600 with 80% of the events between 41.421 and 69.442.
 IEE = Integrated Enterprise Excellence

30,000-foot-level report-out.

Another indicator that a logarithm transformation may be appropriate is that, in lieu of a straight line, there is convex curvature of the accompanying probability plot in which the lower value of this curve asymptotic approaches a physical process limitation—for example, zero hold time in a call center.

For this set of data, a logarithm transformation makes physical sense. Figure 5 (p. 9) applies a logarithm transformation to the data when creating the 30,000-foot-level plot, where a Box-Cox Lambda value of zero equates to a logarithm transformation.

This model-output-improvement transformation provides a more accurate estimate for the 80% frequency of occurrence values. For this particular situation, however, the difference in these best-estimate values (Figure 4 versus Figure 5) is not large because the process output response is not currently approaching zero.

You must note that a 30,000-foot-level I-chart is a high-level assessment of process stability from a producer and customer point of view. In addition, this elevated-process output response provides a statement of process capability and performance relative to its customer and producer needs. With 30,000-foot-level reporting, process stability and a capability and perfor-

mance statement are provided in the same report-out.

The 30,000-foot-level format for reporting is not the same as traditional control charts in which a specific process parameter is to be controlled. For a traditional process-control situation, focus is given to the timely identification and resolution of special-cause signals. It has been stated that control chart transformations are not needed.¹⁶ Data transformations that make physical sense, however, need consideration when creating 30,000-foot-level report-outs.

Mean goal objective and demonstrating process improvement

When you focus on meeting a monthly goal, action is to be taken if the monthly report-out is red. This approach to creating scorecards can lead to much firefighting common-cause variability as though these events were special cause.

As an alternative, the following approach will pursue an effort for addressing an EIP-described improvement need. The specific need for improvement identified in Figure 1 that will be addressed is: “Reduce mean scrap costs (% perf.) from 87 to 55 in 10 months.”

In a 30,000-foot-level report, the I-chart is staged

when a process output response change is identified. Consider that a lean Six Sigma define, measure, analyze, improve and control process improvement project or some other “reduce scrap costs” process-enhancement effort was undertaken and was successful.

For the reduce scrap costs illustration, the I-chart in Figure 6 indicates that an improvement has been made to this process-output response.

The probability plot in Figure 6 uses data only from the most recent region of stability—that is, data from after the chart’s staging. From this probability plot, we note that that mean monthly scrap cost is below the EIP goal of 55 defined in Figure 1; hence, the improvement effort for this 30,000-foot-level metric is considered successful. Because of this metric’s improvement alignment to overall business needs in Figure 1, the entire enterprise would benefit from this process-enhancement effort. A financial estimate for this improvement project also could be determined.


Creating a long-lasting OE system

The described IEE system method structurally addresses the last nine words of Wikipedia’s definition for OE: “Tools toward the sustainable improvement of key performance metrics.”

OE and process improvement organizations benefit when leadership and others are shown how a 30,000-foot-level baseline chart shifted to a new, enhanced level of performance because of their efforts. This form of reporting is applicable whether the improvement effort was the result of a *kaizen* event, lean Six Sigma project or other process-enhancement method. An organizational EIP also could be used to highlight how this metric improvement was beneficial to the entire enterprise.

The IEE approach to improvement project selection via enhancement of process-tracked performance metrics creates an alignment of improvement efforts so that the entire business benefits. This IEE approach is in contrast to a traditional lean or lean Six Sigma deployment, which often becomes a training exercise and “hunt for improvement project” creation system—for example, someone will be trained in lean Six Sigma next week and needs to work on an improvement project.

When organizations desire to create a long-lasting OE deployment, focus should be given to create a structured system to link performance measurements to the processes that created them. IEE offers the roadmap for creation and use of an IEE value chain that addresses this desire.¹⁷ Organizations achieve additional benefit when they use software that can provide automatic updated 30,000-foot-level “clickable” report-

ing, which, among other things, offers a control mechanism for maintaining process-improvement gains. 

EDITOR’S NOTES

A no-charge add-in to Minitab statistical software is available for the easy creation of 30,000-foot-level charts for no subgroup, subgroup and attribute data. Visit www.smartersolutions.com/30000-foot-level-add-in for information.

The following sources summarize the IEE OE system and its 30,000-foot-level performance:

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- Smarter Solutions Inc., “Delivering on Your Core Values,” video, www.ieesystem.com.
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