Column

Rapid NEWS TCT

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This column discusses the ways in which performance is measured — the issue of metrics. Only by measuring something and establishing a baseline can changes (and ideally, improvements) in that something be assessed. However, it is vital to implement metrics that accurately reflect the item to be measured. Furthermore, those metrics need to be constantly refined to reflect improvements in performance and prevent the metrics from becoming unrepresentative. This column looks at how metrics have evolved over time and the reasons and necessity for that development.

Dynamic Measures Underlie Improvement

Bradford L. Goldense, Society of Concurrent Engineering

Anything that is to be improved must first be measured. Measurement has been the driver underlying all major productivity improvement initiatives since the 1970s. First, measurement paralleled the distribution revolution — getting a package from point "A" to point "B." Industry used to define "on-time" as "arriving the week of the request date." Then, it was refined to the "customer request date" or the "order promise date." Then, the week-long period was too variable and the measure changed to a three-day window, on-time became "one day either side of the agreed shipment date." Finally, by the early 1980s on-time became "the day it was promised, not the day before and not the day after." Improvement had enabled a global capability to ship just about anything "next-day overnight" just about anyplace on the globe. If the factory cut into distribution lead time, companies simply paid premium freight to stay on-time.

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During the next decade, measurement paralleled the manufacturing revolution — converting raw materials into a finished product in a package that is shippable. Of the many metamorphosed measures one could discuss in this area, scrap and rework make a good example.

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In the early 1980s, scrap/rework used to be measured as a "percent of cost of goods sold." It was accepted practice for this amount to be 5–15 percent of production volumes and more in some industries, such as semiconductors. The manufacturing productivity revolution ensued and the metric was redefined, all the way to "defects in parts per million, or Six-Sigma." In both distribution and manufacturing, productivity improvements drove the need for new measures. The metrics initially

used to measure performance ultimately became too coarse to measure improved performance. Measures and metrics are dynamic, they move with change and improvement.

Now, in the 1990s, measurement will parallel the product development revolution — getting a product concept into a documented product and process design. In the late 1990s and beyond, it will parallel the product conceptualization and innovation revolution — synthesizing products from customer and market needs and getting this information into a tangible product concept. The issue in the 1990s however, is that industry is only in the beginning of the product development revolution and cannot look back and understand how measures changed. Industry must recognize that product development measures are in the process of changing and try to find the leading measures that will ultimately remain once the product development revolution matures over the next ten to twenty years.

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In the few short years that industry has focused on product development productivity improvements measures are already changing. One of the metrics that will survive time is fairly widely known and serves as a good example — "percent of sales due to new products." In the late 1980s, when 3M popularized the measure and it became widely used, the metric was defined as "X percent of current year sales due to new products released in the past three years." This measure, in the mid 1990s, is now more often calculated using a one-year or two-year period versus three-year. "X" is also changing as well. The early figure defining successful performance was 30%. It has now risen to over 50%. Some world class companies are achieving 60–65% and better.

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Time-to-market (TTM) metrics provide another example of measurement dynamics. TTM used to be defined as "the time from development approval through product launch." It is now defined by leading companies as "the time from product identification, when the 'light bulb' goes on, through product launch." The granularity of TTM metrics is also changing. The first measures simply captured overall time-to-market. New measures are capturing time by phase, time by milestone, and finally overall time.

Summary

Rapid changes in metrics and measurement systems occur with only incremental improvement. Transformational change results in the definition of a new basis for measurement. What then will be the product development revolution equivalent to Six-Sigma? Product development professionals will have to get there to find out.

Biography

Bradford L. Goldense is Founder and President of Goldense Group, Inc., a twelve-year old Cambridge, MA consulting and education firm that concentrates in advanced business and technology management practices for line management functions. He has consulted to over 60 of the Fortune 1000 and has worked in over 200 manufacturing locations throughout North America, Europe, and the Middle East.

Brad is a Member of the faculty at the University of Dayton in Dayton, OH and the Gordon Institute of Tufts University in Medford, MA, and is also a member of the University Council at Cornell University. He holds a BS in Civil Engineering from Brown University and an MBA in Cost Accounting from the Johnson School at Cornell. Brad is a Certified Manufacturing Engineer by the SME, a Certified Computer Professional by the ICCP, and is Certified in Production and Inventory Management by APICS. He is a member of the Board of Directors for Society of Concurrent Engineering and is the President of the Boston Chapter.