

Q & A: Quick Response Manufacturing



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Professor Suri is the Founding Director of the Center for Quick Response Manufacturing (QRM). He is author of the original book on QRM, *Quick Response Manufacturing: A Companywide Approach to Reducing Lead Times* (Productivity Press, 1998), as well as the latest book on QRM, *It's About Time: The Competitive Advantage of Quick Response Manufacturing* (Productivity Press, 2010). Dr. Suri has consulted for leading firms including Alcoa, Ford, Harley-Davidson, IBM, John Deere, Pratt & Whitney, and TREK Bicycle.

Q: Please explain the four core principles of QRM.

A: QRM is essentially a company-wide strategy to reduce lead times, particularly for low-volume and custom-engineered products. While everyone knows that “time is money”, for manufacturing enterprises, time is a lot more money than most managers realize.

To take advantage of this, I developed Quick Response Manufacturing. QRM reduces both external and internal lead times throughout an enterprise. Reducing external lead times means rapidly designing and manufacturing products for specific customer needs. The internal aspect focuses on reducing lead times for all tasks within the organization, such as the time to approve an engineering change. Reducing these lead times results not only in quick response, but also in improved quality and lower cost. Using QRM, companies have reduced their lead times by 80 to 90 percent. Lead time and cost reductions have also enabled companies to compete against low-wage countries.

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QRM strategy is based on four core concepts:

1. **Realizing the Power of Time.** Lead time is much more important than most managers realize. Long lead times create many organizational costs – much more than just work-in-process (WIP) and finished goods! Extended lead times result in added costs of planning, forecasting, expediting, warehousing, lost sales, obsolescence, and more. Such costs are four to five times labor costs. Shrinking these costs is a much bigger opportunity than reducing labor – in a typical U.S. company, direct labor accounts for less than 7 percent of the final price of a product. While using QRM, companies have reduced their enterprise-wide costs by 20 to 30 percent.
2. **Rethinking Organization Structure.** QRM transforms traditional functional departments into an organization consisting of “QRM Cells.” Although the cell concept has been known for some time, QRM Cells are more flexible (for high variety), more holistic (greater ownership by employees), and apply outside the shop floor too.
3. **Exploiting System Dynamics.** By getting managers to understand how capacity, batch sizes, and other factors impact lead times, QRM enables them to make improved decisions. An example is the QRM rule to “strategically invest in spare capacity,” instead of the traditional approach which maximizes the utilization of machines and labor. QRM shows that the cost of additional machine/labor capacity is more than recovered by reduced costs of planning, expediting, inventory, and the other costs of long lead times.
4. **Implementing a Unified Strategy Enterprise-wide.** QRM is not just a shop floor approach; it is applied throughout the enterprise, including office operations and supply chain. With QRM, companies have reduced their quoting and order processing times by 80 to 90 percent. Companies have also reduced lead times and cost for purchased parts by implementing QRM in their supply chain.

Q: How does QRM provide a competitive advantage for manufacturers, especially on a global playing field?

A: As already pointed out, typically, only 7 percent of the price of a product made in the U.S. is due to direct labor. The remaining 93 percent is how you organize your entire enterprise (the supply chain, planning, warehousing, order processing, administration, sales, etc.). Traditional (cost-based) management methods use economies of scale, which result in long lead times in the supply chain and factory. These result in added costs. By using QRM to reduce lead times by 80 percent or more, companies have cut costs by 15 to 25 percent, outweighing the labor cost difference with other countries.

In addition, the future of manufacturing in advanced nations such as the U.S. lies in “mass customization” – providing individually tailored products with short lead times. Through the use of “time-based” (instead of cost-based) thinking, QRM enables companies to make custom products in short lead times. Thus QRM will be increasingly important for companies in the coming years.

Q: Lean manufacturing has been very successful, so why did you feel the need to develop QRM? How does it differ from Lean, and how might QRM augment an existing Lean program?

A: The key Lean tools are derived from the Toyota Production System, and work best for higher-volumes. Core techniques in Lean such as Takt Time, Level Scheduling, and Kanban are designed to eliminate variability, and these break down in the face of high variability or custom production.

QRM is designed for companies making low-volume and custom products. For such companies, it is important to understand there are two types of variability. In QRM you still eliminate dysfunctional variability (caused by errors and poor systems – e.g. re-work, machine breakdowns, or changing priorities). However, you do not eliminate strategic variability (used for competitive advantage – e.g. offering numerous options or individually customized products). Instead, in QRM you exploit strategic variability to gain competitive advantage. QRM enables you to do this through the four core concepts discussed above.

The good news for companies that are already engaged in Lean and/or Six Sigma is that they do not need to change those programs. The Lean/Six Sigma tools can still be used to eliminate dysfunctional variability in the organization, while being complemented by QRM tools that help to exploit the strategic variability for competitive advantage. Thus QRM takes your Lean and Six Sigma programs to the next level.

Q: What was your primary goal in writing your latest book, *It's About Time*? What pragmatic tools might manufacturers gain from reading it?

A: *It's About Time* is structured around the four core concepts, and can be read in 8 to 10 hours. An additional chapter provides pointers for implementation including accounting strategies, cost-justification approaches, and a stepwise process for implementation.

Tools that readers gain include: how to use MCT (a precise metric for lead time) to highlight opportunities for improvement; the power of FTMS (focused target market segments) for designing your QRM Cells; using POLCA (an alternative to Kanban) to coordinate flow for low-volume /custom products; rethinking purchasing policies using time-based methods; and forming Q-ROCs (quick response office cells). The book includes a CD with appendices that provide practical details for implementation.

Q: How might involvement with the Center for QRM help manufacturers gain the most from their implementation?

A: The biggest obstacle to implementing QRM is not technology, but mindset! Because QRM requires companies to rethink policies in all areas, the mindset of everyone – from top management to shop floor employees – needs to be changed. Hence the first step in QRM is training, and the first benefit of involvement with the

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Center is that it provides training on all aspects of QRM. A second benefit is networking and learning from other companies. The Center hosts events with presentations from managers that have implemented QRM, and also arranges factory visits. A third benefit is that with an “Expanded” membership, companies get to work with teams of graduate students and staff experts who analyze the opportunities for lead time reduction and support companies in implementing the QRM recommendations.

I founded the Center for QRM (www.qrmcenter.org [1]) in 1993 and served as its director through 2007, after which the Center has been led by Professor Ananth Krishnamurthy. During the past 18 years, over 200 companies have been members, and many more have attended the Center’s training events and conferences.

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[1] <http://www.qrmcenter.org/>