A Mercer Commentary

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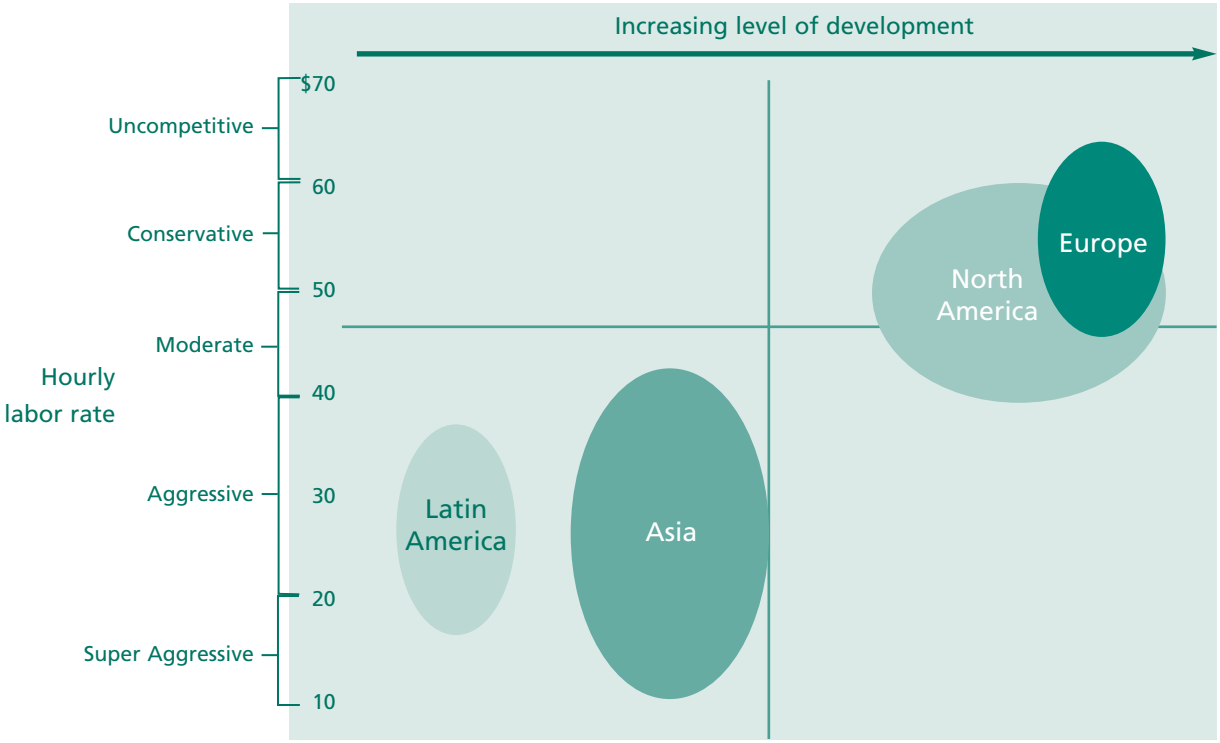
Lean MRO

How domestic MROs can sustain their competitive position

The forecasted steady growth of the global MRO market masks significant underlying turbulence as low-cost Asian and Latin American MROs capture increasing market share at the expense of North American MROs. In the coming years, North American MROs will need to reconsider their response to these competitors. Traditional cost cutting will not enable them to bridge the dramatic wage differentials. Instead, they will need to rethink their operations and organizations radically. "Lean" is a proven and comprehensive approach to operational transformation that—by focusing on the customer and eliminating waste—enables companies to simultaneously decrease cycle times, increase labor productivity, and improve quality and reliability. North American MROs that embrace this approach stand to protect and enhance their competitive positions.

Asian and Latin American MROs represent a formidable threat to North American MRO shops operated by airlines, OEMs, and independents. Between 2004 and 2014, Latin America is projected to increase MRO revenue by a staggering 88% and Asia by 61%, while North America is expected to see only 5% growth[1]. This growth rate differential leads to North America losing roughly nine points of global market share by 2014. In a competitive environment where cost is paramount, the superior cost position of Latin American and Asian MRO shops will prove powerfully attractive to airline customers (Exhibit 1).

Exhibit 1 **Emergence of ultra-low-cost MRO providers**



Source: Mercer analysis

The rise of ultra-low-cost MROs will dramatically change the competitive position of MRO providers (Exhibit 2). Initially, the impact will be felt in the airframe and component markets. As the experience and skills of these overseas competitors increase, it will affect both high-technology products and next-generation platforms.

How can North American MROs respond to this challenge? While many MROs have already achieved significant cost structure improvements through across-the-board cost cuts targeting employees and suppliers, these reductions will not suffice. Such efforts, while effective in the short term, often lead to poor employee morale, which affects productivity. To compete successfully with the new low-cost providers, MROs will need to raise the performance bar yet again with shorter turnaround times, higher quality, and lower total costs. For MROs willing to take on this challenge, Lean MRO provides a proven set of practices to enable this transformation.

1 "Finally! MRO Value on the Upswing" by Frank Jackman, *Overhaul & Maintenance*, April 2004.

Exhibit 2 **Current competitive position of MRO providers**

Overseas MRO providers with lower labor rates will challenge the competitive positioning of North American MRO providers.

	Weak	Competitive position	Strong
Line maintenance	➢Airline	➢Independent MROs	➢Ground handlers
Components	➢Airline ➢Stand-alone	➢Independent MROs	➢OEM
Engine maintenance	➢Airline	➢Independent MROs	➢OEM
Airframe maintenance	➢OEM	➢Airline	➢Independent MROs

Source: Mercer analysis

What is 'Lean'?

"Lean" is a business philosophy pioneered by Toyota after World War II. It harnesses a set of standard tools and techniques to design, organize, and manage operations, support functions, suppliers, and customers. Compared with the traditional system of mass production, Lean meets or exceeds customer requirements while using less human effort, space, capital, and time to make a wider variety of products.

Lean techniques cut costs by eliminating waste—those items and process steps the customer doesn't value. These reductions paradoxically increase quality as production problems become more visible and root causes more easily identified and remedied in simplified work processes.

The approach increases throughput dramatically by a focus on single-piece continuous flow and a flexible structure of cellular product-family work teams. Since flow starts with the pull of actual customer demand, overproduction is essentially eliminated. Inventory levels are reduced and turns increased through the combination of just-in-time (JIT) and kanban-controlled production. As a result, Lean significantly reduces working capital requirements.

Fixed assets are managed more efficiently through the application of Total Productive Maintenance and revamped accounting systems that seek to measure value in the eyes of the customer. In addition, a by-product of Lean is more available floor space, freeing additional capacity to support a more aggressive sales effort.

To achieve the ambitious goal of continuous improvement and to create flow and pull, there are four key elements to consider: production system design, organizational system design, training, and culture (Exhibit 3).

- *Lean production system design*. The Lean production system is designed to support a customer-driven business model that encompasses production planning and control, process management, quality, scheduling, material management, and production.

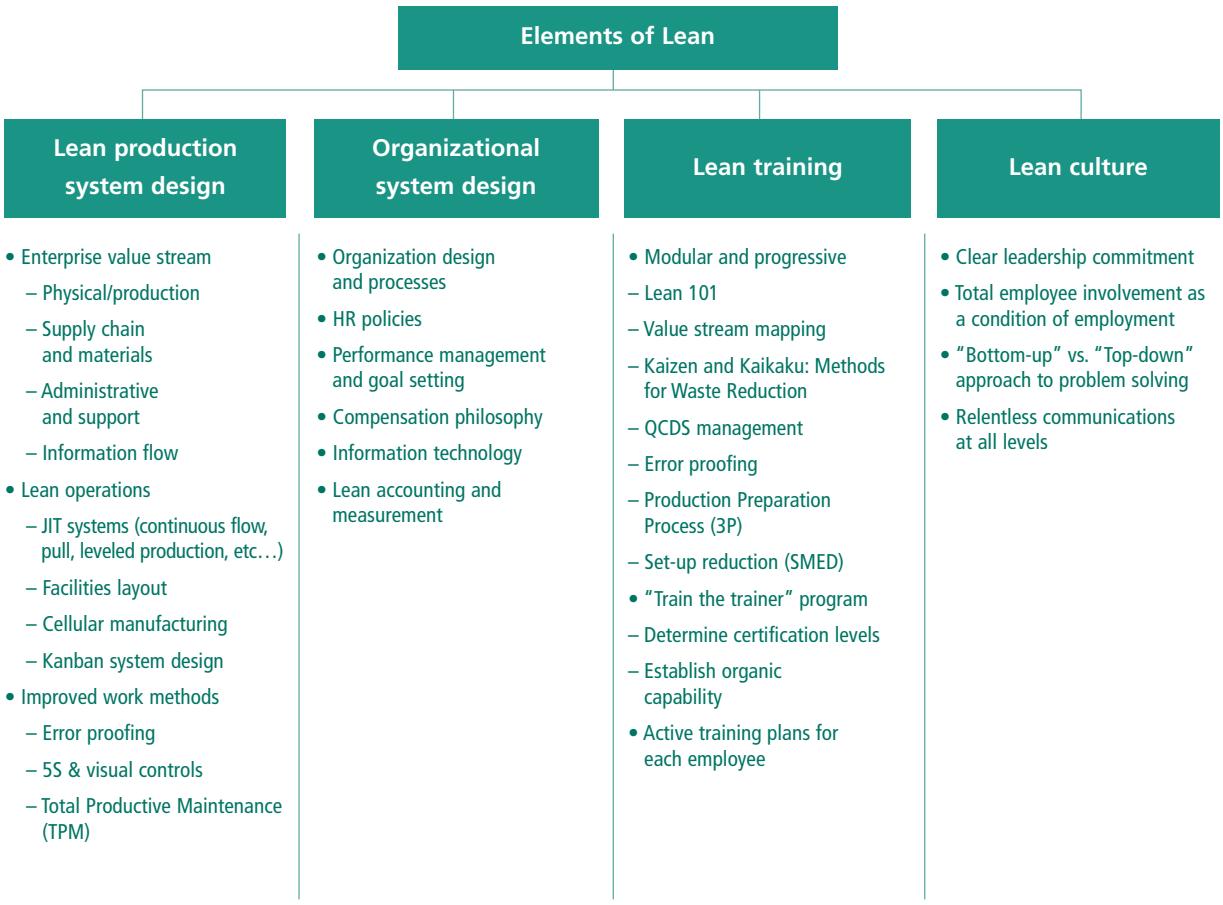
- *Organizational system design*. Once the production system has been developed, organizational systems and structure must be adapted to reinforce, stabilize, and institutionalize the new way of doing business through the alignment of functions such as HR, Finance, and IT, and the encouragement of desired behaviors through performance measurement and compensation.

- *Lean training*. While it is essential for the first six to 12 months of a transformation that 75% of the Lean effort comes from the top, it is equally important that 75% of the Lean effort come up from the bottom after the first year. This is only possible through appropriate training.

- *Lean culture*. Lean culture focuses on sustaining change through leadership, empowerment, and communication.

Most Lean transformations that fall short of their objectives typically fail to take a comprehensive approach to each of these four dimensions.

Exhibit 3 **The key elements of Lean**



Can Lean work in MRO?

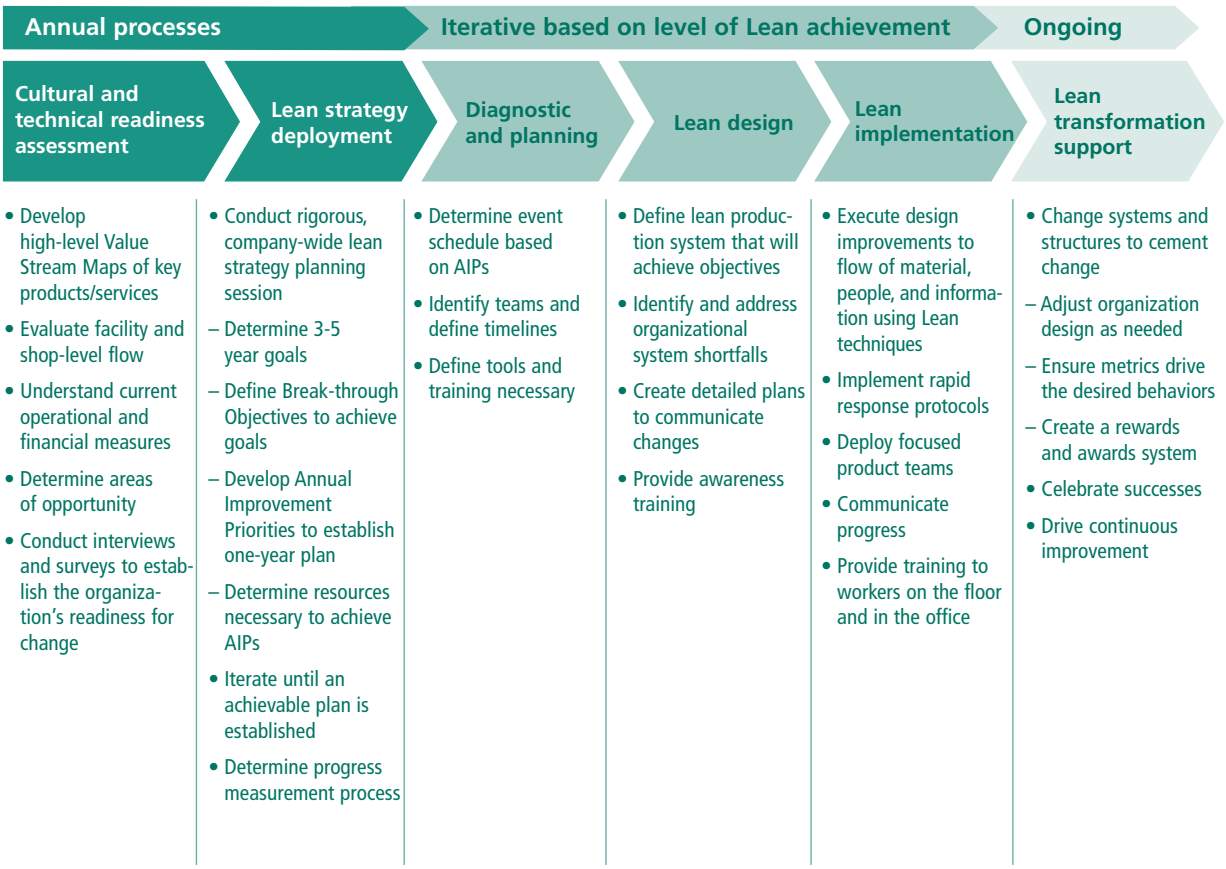
Compared with traditional manufacturing, MRO provides unique challenges. By its nature, it is more complex in both work scope and variability of demand. "Lean" addresses the variability inherent in job shops with mixed modeling, a tool that offers great flexibility. MRO job shops can be analyzed to identify product family patterns; reorganized into these natural groups; redesigned in a cellular fashion to increase flexibility and adaptability; and managed with kanban to achieve takt, flow, and pull.

Another technique to manage the variability and variation of an MRO environment is the integration of Lean with Six Sigma. This approach supports continuous improvement through the use of the DMAIC (Define, Measure, Analyze, Improve, and Control) model and related tools such as SIPOC, process analysis, and standardization.

A successful approach to Lean transformation

Lean implementation benefits from a holistic approach that addresses all elements from strategy to the shop floor (Exhibit 4). Some of these steps, such as objective-setting, need to be performed annually to ensure constant recalibration. Others are iterative processes that drive waste out of the system and deliver continuous improvement. Still others nurture the Lean culture. Faithful adherence to this cycle leads the way to Lean excellence.

Exhibit 4 **Elements of a successful approach**



'Lean' results

Lean manufacturing represents an opportunity to protect future revenues through true competitiveness. Our experience suggests that with Lean, MRO shops can achieve extraordinary performance improvements. Over a three- to five-year period, it is not uncommon to realize:

- Inventory reductions of up to 75%
- Labor productivity increases of up to 20%
- On-time delivery improvement to 99+%
- Reduction of defects by 20% annually, with zero defects possible
- Total lead time reductions of up to 75%
- Floor space reductions of up to 50%
- Set-up time reductions of up to 75%
- Capacity increases of up to 20%

Things often get worse before they get better. Lean will uncover problems long hidden amid the waste. The benefits, however, clearly justify the journey.

Moreover, this level of performance improvement will be essential to the medium-to-long term viability of North American MRO providers. With a good strategy and support, substantial Lean benefits can be achieved in as little as six months with exponential benefits thereafter. Given the growth forecast for MRO demand over the next ten years, now is the time to start. ❖

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