**Abstract.** Lean thinking and operations challenges us to eliminate all waste—wasted time, wasted motion, wasted materials, wasted quality, wasted manpower, wasted machine hours, wasted transportation and wasted facilities. Unfortunately many see the concept of lean operations as just for factory floor operations, but it is much more than that. Indeed with all the work we have done in the last 25 years some of the best opportunities now are in the staff and service operations. Our challenge is to accept and apply the concept that lean thinking and lean operations apply to all facets of organizations to include leadership and management. Simply put lean thinking and lean operations are a mentality that calls for a comprehensive all out effort by everyone in the supply chain to identify and remove waste. It is all about eliminating costs from all processes. These ideas are ubiquitous and universal. We will understand the profound truth of that statement and how to make it work.

“You can’t solve problems with the same thinking that caused them.”
Albert Einstein

**Lean Thinking and Operations.** Jim Womack and Dan Jones in their book *Lean Thinking* say that Lean Thinking and Lean operations require the application of five concepts, “Specify value” “value stream” “Pull” “Flow” and “Perfection.”

Sherry Gordon speaking at the NAPM International Conference in 2000 briefly defined these ideas for us in supply chain management this way and in practical terms.

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<th>LEAN PRINCIPLE</th>
<th>SUPPLY CHAIN PRACTICE</th>
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<td>Value</td>
<td>Collaborative Product Development</td>
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<td>Value Stream</td>
<td>Supplier Partnering, Value Stream Analysis</td>
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<td>Pull</td>
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<td>Perfection</td>
<td>Kaizen Blitz, Lean Masters</td>
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<td>Continuous Improvement</td>
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The discussion below highlights these five lean principles and two corollary ideas.

**Specify Value.** The idea that we can define what the ultimate customer wants in a specific product or service or both with a specific price at a given time. Three key questions emerge; 1) who is the customer, 2) what does our customer expect, and 3) where is the value created. So we are talking about research, information, market knowledge, communication and new organizational sharing processes. Our thought process has to include the entire supply chain—end to end.
Value Stream. This is all the actions to identify and solve a customer’s problem to include the early product research development, design, testing through the information phase of supply development and initiate the transformation processes, building the logistics and distribution systems to the ultimate sales and service for whatever the good or service or both was to the customer. Now we supply managers have been calling this the supply chain for some time. To the extent that you really practice supply chain management you are ahead of the game. Some people now call this idea the Value Chain. We are all talking about the same thing.

Flow. This fascinating idea demands that after we have identified the customer and created that value stream with all the waste eliminated we have to design the system to flow like water down a steep hill—effortlessly and without resistance. Most of our ideas and concepts for organizational management such as departments, hierarchical structures, and production control processes such as batches conflict mightily with the idea of flow. Most of our traditional organization schemes are start, move, work, stop, move, store, retrieve, and move. These can all be anti-flow concepts.

Pull. Pull from the customer is required to get the visibility to make flow possible. Sherry Gordon says that systems have to be self-explaining, self-ordering, self-regulating, and self-improving so that what is supposed to happen does happen on time, day or night. When customers can get what they want when they want it most of the variation in demand goes away and stable systems develop. Now we have an even better concept developed from pull and visibility. If suppliers can see your plans and operations schedules, they can be responsible to have the goods, supplies or services there and we don’t even have to take an action. It just happens. I know a medium sized supplier that uses the web to look into the MRP data base for one of its huge customers every day to pick out its products to schedule its own operations days and weeks ahead. The customer’s process requires the supplier to prepare and submit a paper PO confirming the order created by the supplier. This confirmation is totally unnecessary and is wasted time, paper and processing for the customer and supplier. Why confirm what the supplier already knows and indeed they are working to prepare? Is this a wasteful policy? “Where’s the trust?”

Perfection. When your company realizes that the benefits of accurately specifying value and designing the value stream along with flow and pull really work, something strange happens. People realize that there is no end to being better and that we can continue to reducing effort, time, space, cost, and mistakes and at the same time offer products or services that are more nearly what the customer expects. Perfection is possible! Ideas and concepts such as Total Quality Management (TQM) and Continuous Quality Improvement (CQI), SPC and Six Sigma have been trying to get us here for years, but failed in the sense that they were mostly about measuring and beating up on something or somebody instead of changing the root cause of the problem—managerial policies that ensure the wrong behavior. If a concept or tool reduces waste and improves quality, it is a tool useful for lean thinking.

Time. It is all about the clock and eliminating wasted time. We need to study and map every process, every action to first identify actions or behaviors that detract more than their costs from value and eliminate them. Items such as poor quality, over design or specifications, are examples. Professor Rajan Suri, University of Wisconsin, in his book on Quick Response Manufacturing (QMR) reported that one of his research projects covering 400 companies that were trying to reduce cycle time showed that 70 percent of the policies in those companies
were direct obstacles to reducing cycle time. Similarly, we should recall that Dr. Deming asserted that managers caused 85 percent of the problem.

Here is a set of policies that may affect lean thinking and operations in supply management. The question is “How do these policies constrain lean thinking and operations to improve supply management?”

- Attitude toward quality of product and service
- Parts interchangeability
- Diversification and other strategic plans
- Long-range planning
- Attitudes toward the employees
- Attitude toward full implementation of EDI
- Attitudes toward make or buy and outsourcing
- Attitude toward global sources of supply
- Attitude toward suppliers and external supporting organizations
- Attitude toward strategic planning
- Attitude concerning participatory planning and functional involvement
- Training and support of the strategic team approach

We want to identify policies and procedures that cause non-value adding action or behavior and eliminate them. For example, we can look again at the big customer’s policy above that required paper confirmation of the supplier’s self-generated order. That policy caused wasted work for both the supplier and the customer. One has to wonder why?

**Lean Masters**: We have known for a long time that dynamic change requires highly dedicated leaders as change agents. In lean thinking, we call these people, lean masters. They are individuals from the various disciplines in an organization that can focus on a process, are results driven, and get things done. Their job is to inspire and lead change in the supply chain. All processes are targets—to them success is never final and their behavior is driven by a “why not attitude.” An example is Deere’s force of supplier development engineers. These engineers have one job—help suppliers develop lean or leaner operations with significant benefits for both Deere and the supplier.

**Waste And Wasteful Thinking.** Taiichi Ohno, the great Japanese production and quality thinker and CEO of Toyota, defined seven wastes as targets in his Toyota Production System. His list included these production-oriented results of operations.

1. Waste of producing more than you need
2. Waste of inventory (anything that is excess to current needs)
3. Waste of waiting (idle operator time or machine time)
4. Waste of motion (movement of people or machines that does not add value)
5. Waste of transportation (any materials movement not directly tied to value-adding operations)
6. Waste of making defective parts
7. Waste of processing (any process that does not add value to a product)

We can easily extrapolate these wastes to staff or service type processes and operations in all walks of life around us. For example, preparing excess food in a restaurant, holding excess
perishable fruits and vegetables in a grocery store, to many steps in the purchase approval process, isolation of design engineering, supply management and supplier processes from each other or customers, etc.

The impact of these various types of waste are cost. We should control or eliminate these costs. Professor Suri challenges us to think about and control five sets of costs in terms of waste. These cost are generated by 1) poor quality, 2) obsolescence or loss, 3) long lead times, 4) unresponsiveness to customers and 5) increasing response times. Clearly, our response to waste and its costs in all operations is important and includes the opportunity for significant positive financial impact for our organizations. Is there an organizational element with overall waste reduction responsibilities? Have waste reduction objectives and authority been established. This look at the five lean principles and corollary ideas set the stage for us to look at actions or processes that can be used to create lean thinking and operations in our organizations.

“There is a better way. Find it.”
Thomas Edison

Recognition That Lean Opportunities Exist. Supply chain leaders and others must accept the fact that tremendous opportunities exist everywhere and set the stage for organizational revolution through application of proven tools. Even simple benchmarking and research can quickly identify opportunities for leaner operation.

Dedicated Leadership Support. Dedicated leaders are needed at every level of the supply chain to ensure that cultural changes are started and maintained. Turning a supply chain into a lean operation is not for the faint of heart nor is it a one-time, short-term frolic in acronyms. Rather it is a long-term process to set the supply chain on a new course and maintain or improve that course forever. Lean can always be leaner and what seems perfect today can always be improved with time team processes and more thought.

Education And Development. Every reference concerning lean thinking and operations calls for leadership to stress training and development for associates along the entire supply chain. Selecting and developing the “Lean Masters” are the epitome of this process. A CAPS Focus Study published in April 2000 identifies the skills needed by world class. The list of the top ten important skills identified in the study that could enhance lean thinking and lean operations are presented in the table on the next page. These ten skills and the study provide a sound foundation to reengineer our organizations and our attitudes toward professionalism and significant change in supply chain operations that could lead to leaner operations and thinking.

Build The Lean Program Deliberately. Every lean project must address the highest priorities with specific project plans with objectives, assigned and authorized resources and buy-off from required levels of leadership. Above all else we need a carefully defined objective that specifies what is to be achieved, by when and in what amount. Every project has a team and an approved plan of action with senior managerial support and mentoring.

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<th>Skills</th>
<th>Goals</th>
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<td>Interpersonal communication</td>
<td>Better teamwork, customer relations</td>
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Customer focus | A totally new orientation for service
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Ability to make decisions | Quicker and at lower levels, by teams
Negotiation | More people to be negotiators
Analytical to include statistics and operations | Better statistical and process analysis
Managing change | Everybody accepts and makes it
Conflict resolution | Better support for the team and supply chain
Problem solving | Quicker and at better at lower levels, by teams
Influencing and persuasion | Leaders not traditional managers
Computer literacy and advancing skills | Training for everybody—a requirement

**Execution Of The Project Plan.** Every project plan must have a definitive project flow plan or map with a detailed schedule that will be followed. This schedule must show how when the primary objective will be accomplished. In addition to the schedule the metrics for every project should be identified with the processes and goals to be met.

**Identify, Verify And Control Savings To Ensure Strategic Use.** President Ronald Reagan made the words “Identify and Verify” important with the negotiations on nuclear weapons. The words are equally important to us as we introduce lean thinking and lean operations. Our organizations desperately need cost reductions and better operations to become more competitive and help ensure success. We need to carefully identify and justify savings to provide senior managers the opportunity to recognize, acquire and strategically use the funds made available from lean thinking and lean operations. Strategic use of the cost reductions is not our problem.

**Expand Program To The Supply Chain-Multiple Tiers.** Once our lean thinking and lean operations program is founded, we have to extend it to the supply chain. Many people start the projects in the first tier and they just stay there. Womack and Jones show how the entire supply chain must be involved if you want significant results. The logic here is simple—costs incurred by any form of waste anywhere in the supply chain stay with the product forever. We also know that many suppliers when they are involved can and will make significant contributions to processes.

**Communicate Successes And Corrective Actions Widely.** All program success stories must be widely communicated and adopted where possible in all systems. Here we know that team involvement in the process enhances the possibility of acceptance by other organizational elements.

**Recognition And Rewards.** Almost everybody likes and appreciates appropriate recognition and reward. The associates that make lean thinking and lean operations happen are no exception to this fact of human behavior. Senior managers everywhere should come unglued from misery reward ideas based on historic processes that didn’t work then and truly reward associates for
progress. Why not treat dynamic associates as part owners of their ideas and creativity. Make a few millionaires and see how involved, creative and successful your associates will be for you and your operations, regardless of the organization’s size or purpose.

**Prepare To Repeat The Process.** We know that properly supported success breeds more success. Hence lean thinking and lean operations are a never-ending process. Once we start it we must be prepared to continue the process and expand it into all facets of our operations.

**Theory of Constraints (TOC).** Simply put every organization, service or production, profit or not-for-profit has a set of constraints that constrain maximum operations. One of these constraints is critical (CCR) and it limits all system operations. Time lost at the CCR is time lost to the entire system. Every workstation is a constraint (CCR) or nonCCR, but only one can be the CCR at any given time. Change the CCR and one of the nonCCR becomes the dominating process/factor and the new CCR. This is true for any process until you have designed absolute balance.

**Conclusion.** Supply management is about creating and leading the supply chain to ensure continuity of supply with better service and more involvement with suppliers and others to provide our customers unexpected results. Lean thinking and lean operations along with supplier relations and cost control are critical concepts that hold great potential to improve our operations, reduce cycle time, control costs and enhance quality along with increased process productivity.

**REFERENCES**

**Book References**


