The 15 Most Common Mistakes in Lean Implementations

The pitfalls of an exploitation framework.

by Ulises Pabon

"THREE YEARS AFTER we've launched our lean manufacturing initiative, I've come to realize that I had no idea what lean was about when we first started." These are words of wisdom from the Vice President of Manufacturing of a leading global Medical Devices company. His words echo our conclusions after interviewing more than 200 managers and Lean practitioners in 71 companies throughout the United States, Mexico, the Caribbean, and Europe.

Such brutal honesty, however, is rare. Many managers remain oblivious of the mistaken premises and assumptions they carry regarding Lean. Seduced by the significant improve-

ments Lean promises to deliver and blinded by the apparent simplicity of its tools and techniques, they jump on the Lean bandwagon ill equipped and misinformed.

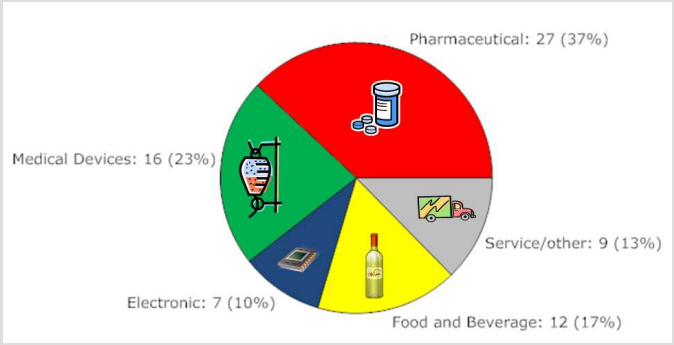
About the Research

We performed over 200 semi-structured interviews with managers and lean champions from 71 different companies engaged in lean implementations. Interviewees were asked to identify their most significant mistakes and the most important lessons learned. Below are the statistics by geography, industry, and length of time into lean implementation.

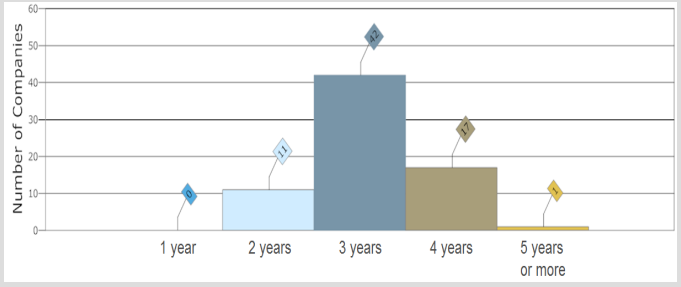
Distribution by Geography

Total of 71 companies

Distribution by Industry



Distribution by Years into Lean Implementation



Ever since James P. Womack and Daniel T. Jones coined the term Lean Manufacturing to describe the Toyota Production System in their seminal book *The Machine That Changed the World* (HarperCollins, 1991), managers around the world have been exploring its principles and applying its concepts. Since then, it's safe to say that Lean implementations have produced billions of dollars in savings by optimizing processes and eliminating waste along the value chain. Although Lean sprouted from the production floor, Lean principles and methods have proven to be applicable to the service industry as well. While not as blatant as the Reengineering movement of the early '90s, the Lean movement has been capturing practitioners left and right, across all industries, delivering extraordinary results in the process.

However, amidst the numerous impressive case studies, a sea of false starts abound. Many managers we spoke with find themselves "drowning in a sea of half-understood tools and techniques." Others, unaware of their narrow interpretation of Lean, boast successful implementations when they've actually barely scratched the surface.

Our research helps explain why so many companies experience frustration and dismay with such a powerful methodology. In this article, we've highlighted the 15 most common mistakes made during Lean implementations (see box: About the Research). Our hope is that an open discussion of these mistakes may accelerate the learning curve for many Lean practitioners and improve their odds of success.

An in-depth discussion of Lean tools and techniques is beyond the scope of this article. Nevertheless, we've included a "Quick and Dirty Glossary of Terms" (see box: Lean Manufacturing 101, page 8) to jump-start newcomers to the field.

5S

5S is probably the most popular and the most misunderstood Lean technique. Most practitioners focus on the obvious objective of using this technique to organize an area and overlook the underlying objective of instilling a continuous learning culture among its practitioners.

The two most common mistakes when implementing 5S are:

M1: Thinking of 5S as something you do to an area, and
M2: Imposing 5S top-down, with limited involvement bottom-up.

The clearest tell-tale sign of an improper 5S implementation is hearing someone comment: "We 5Sed the area last week." When Lean practitioners interpret 5S as something you "do" to an area rather than something the area users do to themselves, the seed for failure besieges.

One Lean champion of a respected electronics manufacturer told us, "When we visited other companies where 5S had been implemented, we were overwhelmed by the visible cues – the areas were clean and neatly organized, there was a place for everything and everything was in its place, information posted on the area was relevant, current, and easy to understand. However, we didn't see the underlying practices that sustained and continuously improved this state of affairs."

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Lean practitioners are easily seduced by the obvious and remain oblivious to the profound.

In their rush to implement, once they learn about 5S, they storm an area like paratroopers—sorting, organizing, and cleaning left and right. After about 4 hours of effort, the area is left in perfect condition and the team records its accomplishments with before and after pictures. In the process, they've disregarded the most important aspect of 5S: changing the area team members' mindsets and instilling a culture of continuous learning and improvement. This, of course, doesn't happen in an afternoon.

Since the practitioners have barely scratched the surface, the 5S accomplishments fizzle away. Often, they are maintained through constant non-value-added supervision in an effort to "keep the area organized and clean." When questioned regarding 5S, many managers react with the typical "been there, done that" when in reality they don't have a clue of what they're missing!

5S is a set of principles, values, and practices that people adopt as a guide to working together productively. You don't 5S an area. People responsible for running a process or an area run it under a 5S regime or protocol. 5S is a set of practices people adopt. As a result of adopting these practices, they work together differently. 5S suggest a different set of assumptions and it's all about process/area ownership, freedom and autonomy to improve, pride for excellence, and the ability to control outcomes.

5S is a breakthrough to the extent that it captures profound principles of learning and improvement and it presents them in a simple framework. However, its simplicity is its nemesis.

Unless Lean practitioners learn that 5S is, in essence, a means towards increasing workers' knowledge and a vehicle to channel their interest in improvement, they will continue to fail to realize the profound long-lasting benefits a proper 5S implementation can deliver.

Value Stream Mapping

Very early in a Lean implementation, leaders learn to identify non-value added activities. The elimination of these activities lies at the heart of Lean. Value Stream Maps are probably the most important tool in sketching out a process and identifying these non-value added activities.

Three common errors gravitate around Value Stream Maps:

M3: Equating waste reduction with cost cutting,
M4: Remaining aloof to the larger global end-to-end Value Stream, and

The 15 Most Common Mistakes in Lean Implementations

1	Thinking of 5S as something you do to an area.	5S
2	Imposing 5S top-down, with limited involvement bottom-up	
3	Equating waste reduction with cost cutting.	Value Stream Mapping
4	Remaining aloof to the larger global end-to-end Value Stream.	
5	Assuming your Future State VSM is nothing more than your Current State VSM with the identified improvement opportunities corrected or addressed.	
6	Equating visual workplace with top-down visual communication.	Visual Workplace
7	Viewing TPM as an improvement initiative that exclusively relates to engineering and maintenance personnel.	Total Productive Maintenance
8	Using OEE to evaluate operations rather than as an improvement gauge.	
9	Equating Standard Work with procedures.	Standard Work
10	Engaging in "industrial tourism" and thinking you are benchmarking.	Benchmarking
11	Pursuing a one-size-fits-all solution to production planning and control.	Flow
12	Forgetting to reduce supermarket inventories once established.	
13	Preconditioning continuous flow to waste elimination.	
14	Believing you will achieve a lean transformation applying lean tools.	Strategy and Competitiveness
15	Betting your strategy on lean.	

M5: Assuming your Future State VSM is nothing more than your Current State VSM with the identified improvement opportunities corrected or addressed.

Mistake 3 occurs when Lean practitioners equate waste reduction with cost-cutting. The former is an exercise in identifying and eliminating non-value-added activities; the latter is an exercise in identifying segments in the P&L statement.

The cost-cutting trap is easy to fall in. Managers that approach Lean for the first time are bombarded with alien concepts. In an effort to understand and grasp these concepts, they try to peg them into their existing cognitive pigeon holes. Relating waste to cost reduction is natural. However, although they may be construed as related, their very essence is dramatically different.

Mistake 4 occurs when Lean practitioners focus their value stream map within the confines of their operation and remain aloof to the broader global value stream. One Lean/6-Sigma Black Belt from a leading pharmaceutical company told us, "We were diligently producing a detailed value stream of our high-volume product family, from raw material to finished good, identifying pockets of waste and non-value-added activities along the process. Unaware to us, and to our dismay, someone up in corporate was concurrently doing the same, only at a higher level. They were rationalizing the global value stream of our product line and concluding that our plant was not necessary!"

Lean practitioners that disregard the big picture can get easily entertained with the trees while failing to see and understand the forest. While waste reduction within an operation will, for sure, deliver improvements in cost and lead-time, a broader redesign of the global supply chain may render that operation irrelevant.

Mistake 5 is committed by Lean practitioners that think that the desired future-state of a process is achieved by eliminating waste and addressing all the improvement opportunities found in the current process. By doing so, Lean practitioners fail to realize an important truth relevant to systems design: you will not necessarily get what you want by fixing what's wrong!

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This trap may have its root in management's tendency to hone-in on a problem and fix it. Once waste is identified, it becomes an irresistible target. However, a future-state VSM incorporates both current opportunities as well as best-in-class performance. In their effort to improve their process, victims of this mistake often fail to see options and possibilities "outside of the box."

Visual Workplace

Walk into a Lean facility and more than likely you'll see wall-to-wall displays of key performance indicators, improvement storyboards, process flowcharts, and product descriptions. Add to that the clear specification of process flow, control-tower lights indicating the status of the equipment, and clear specification of what goes where and you've got a clear picture of what Visual

Workplace is all about. Nothing could be farther from the truth!

While all of these artifacts are important, the true essence of a visual workplace resides in its ability to empower employees by quickly and easily answering two critical questions through the use of visual devices:

1) What do I need to know, that I don't know right now, in order to do my work?

2) What do I know, that others need to know, in order to do their work – or in order to do it better?

Top-down communication schemes don't answer these questions. Lean practitioners that exclusively focus visual devices on top-down communication commit the sixth most common mistake in Lean implementations:

M6: Equating visual workplace with top-down visual communication.

For sure, top-down communication is important. However, no amount of top-down communication will close front-line information gaps that directly impact your workforce's effectiveness.

This point was best summed up by the Director of Nursing of a tertiary care hospital we visited. Well within its fourth year into Lean, the Director of Nursing told us, "When we shifted our attention from top-down communication to devices that directly addressed our nurses' information gaps, we immediately saw an impact on the units' productivity."

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Total Productive Maintenance

Total Productive Maintenance or TPM encompasses a series of practices whose objective is to optimize the equipment and machinery critical to your process, be it a bottling plant, a nuclear reactor, or the MRI scanner in radiology. The two most common mistakes when implementing TPM are:

M7: Viewing TPM as an improvement initiative that exclusively relates to engineering and maintenance personnel, and

M8: Using OEE to evaluate operations rather than as an improvement gauge.

Since the "M" of TPM stands for Maintenance, many managers commit Mistake 7, wrongfully concluding that TPM in an issue that exclusively pertains to the engineering and maintenance departments.

In reality, although TPM encompasses a number of techniques that highly depend on equipment expertise, the most dramatic transformations that need to occur under a TPM program need to happen in operations — with the people that operate the equipment. In order to continue feeding the improvement spiral, equipment operators need to master the equipment they use; they need to be able to detect the subtle early signs of wear and tear and they need to be able to perform cleaning, lubrication, and basic maintenance and repair on the equipment they operate. In a way, TPM is a natural extension of 5S. Operators play a fundamental role in a TPM improvement scheme and should not be left out of the picture.

Mistake 8 is a rather technical one. OEE stands for Overall Equipment Effectiveness. It is a critical measure that integrates three key equipment related variables in one percentage: equipment availability (the opposite of downtime), equipment efficiency (how much product the equipment is actually turning out), and the quality yield of the output produced.

Measuring and improving OEE is invaluable when you are dealing with an individual piece of equipment—especially if that equipment happens to be the bottleneck of your process.

Problems start, however, when managers blindly use OEE results to evaluate and compare operational units. For starters, using OEE to compare operations with different product-mix profiles (e.g., a high-volume/ low-mix operation versus a low–volume/ high-mix operation) is equivalent to comparing apples to oranges. Managers that use OEE out of context will arrive at mistaken conclusions. Worse yet, by converting an improvement tool into an evaluation tool, managers contaminate and sometimes destroy the continuous improvement culture they are trying to promote.

Standard Work

"If Standard Work is about assuring things are always done a certain way, and procedures are the vehicle to establish how things are done, it made sense to us that Standard Work was all about documenting our processes in procedures. Boy were we wrong!"

These are the words of the Quality Manager of a 400 employee food-processing plant, which fell victim to Mistake 9:

M9: Equating standard work with procedures.

Actually, standard work has very little to do with procedures. It's a framework that turns every opportunity to perform a task into a scientific experiment! This is perhaps one of the most powerful but imperceptible elements of Lean and, for sure, demands explanation.

For an assembly line worker who knows that it takes her 25 seconds to mount an inlet pipe on the medical device she's assembling (and she knows this, not because it was imposed on her by some industrial engineer, but because she was directly involved in establishing the standard), the fact that it took her 29 seconds to complete the last unit instantly raises a flag. Since she knows she can get this done in 25 seconds, she knows something is wrong.

Standard work, performance, and results form a closed circuit that enables operators to quickly identify problems and improvement opportunities. Workers cease to be zombies blindly following instructions and become scientists constantly testing a work hypothesis (the standard work) against reality. This virtuous cycle becomes a platform for learning and continuous improvement.

In a continuous improvement culture, standard work is constantly being redefined.

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Lean Manufacturing 101: A Quick and Dirty Glossary of Terms

Information regarding Lean concepts, practices, and tools is readily available on the internet. As a starter, we offer the following glossary of terms.

5S: 5S is a simple but profound method that guides the operators of a process, an area or a department through five steps directed towards organizing the area and engaging the team in a continuous improvement process. Each "S" corresponds to a Japanese word. They have been loosely translated into English as: 1. Sort: define an area's purpose and use this definition to determine what belongs in an area and what doesn't. Remove items that are not needed in the area. 2. Set (Organize): make sure that there is a place for everything, and that everything is in its place, 3. Shine: adopt a cleaning regime; keep all tools and equipment clean, 4. Standardize: standardize the way work is done to minimize errors and increase productivity, 5. Sustain (and Improve): adopt continuous improvement as a way of life.

Value Stream Maps (VSM): A Value Stream Map is a graphical representation of all of the steps in a process. Special symbols are used to represent value-added and non-value-added activities. Value stream maps assist practitioners in identifying waste along the process. Current-state VSMs depict the process "as is" or in its present condition. Lean practitioners construct future-state VSMs to depict the desired state of the process and help identify the improvement projects that will help them get there.

Visual Workplace: Visual Workplace entails the practice of utilizing visual devices (indicators, signals, visual controls, and visual guarantees) to minimize the time spent searching for information and to create a work environment that is visibly organized and clear.

Total Productive Maintenance (TPM): TPM encompasses a series of practices designed to reduce equipment down-time, improve equipment availability and efficiency, increase output, and improve quality. TPM integrates preventive maintenance practices with predictive maintenance (where future wear and tear is anticipated and preempted based on current use), and parametric maintenance (where maintenance protocols are driven not by length of time but by process conditions). Other TPM practices include Quick Change Over (where set-up time between production runs is reduced) and Autonomous Maintenance (where equipment operators learn how to clean and maintain their machines).

Standard Work: Standard Work refers to the design of work activity in a way that facilitates the identification of variability or out of control conditions.

Benchmarking: Benchmarking is the process of identifying best-in-class performance and best-practices in other companies and adopting such practices to drive improvement.

Continuous Flow: Conventional mass production argued that costs would be reduced by manufacturing goods in large production batches or lots. This led to complex forecasting schemes and large quantities of finished product inventories. Lean proposes a different approach: strive to produce in a "one-piece" continuous flow, synchronized to actual customer demand. This idea is perhaps the most challenging concept within Lean and the most difficult to implement and achieve.

Kaizen Events: Kiazen in Japanese means continuous improvement. A Kaizen event is a work session where employees attack a problem or an improvement opportunity, identify root causes and formulate a solution. Kaizen events are an excellent employee involvement vehicle and an effective mechanism to channel employees' energy towards improving performance.

Standard does not mean fixed; it means "having been specified." As your product or process knowledge increases (i.e. as you learn), your standard will change.

Managers and Lean champions working in highly-regulated companies with bureaucratic documentation systems confront steep challenges when they try to reconcile the true dynamic nature of standard work with the lethargic response of their "control" systems.

Benchmarking

Benchmarking is the process of comparing your business processes or performance metrics to processes or performance metrics of another business considered to be an industry standard or best practice. The methodology was popularized by Xerox in the '80s and remains today a widely used practice among business leaders.

Benchmarking is not a Lean tool, per se. However, it was brought up so often by the managers and Lean champions we talked with that it made it into our top 15 list.

During our interviews, many managers and Lean champions confessed to engaging in "benchmarking" exercises with very little preparation and a vague notion of what to do with the information they gathered. It soon became obvious we were facing a common mistake:

M10: Engaging in "industrial tourism" and thinking you are benchmarking.

A lot of "industrial tourism" goes on under the disguise of "benchmarking." Industrial tourism is not, in and of itself, bad. From an innovation perspective, obtaining exposure to other operations in other industries can lead to interesting connections and creative ideas. It is said that Henry Ford's idea of the assembly line originated from a visit he paid to a slaughter house. After seeing the hanging caucuses being pushed along a line from butcher to butcher, the idea of using the same concept for cars was born!

Benchmarking, however, is a more systematic process. Proper benchmarking engagements are accompanied by strict definition of the process area to be benchmarked, diligent measurement of key performance indicators previous to going "outside", proper identification of true best-in-class performers, comprehensive education in benchmarking etiquette and agreed methods for the debrief, analysis, contextualization, and adoption of best practices.

Many of the Lean champions we interviewed admitted using convenience rather than rigor as the driving force behind their incursions in "benchmarking." In many cases, learning was cosmetic. In the few occasions where "jewels" were serendipitously found, the lack of a disciplined approach took its toll, turning the effort into a worthless endeavor.

Flow

Continuous one-piece flow is the holy grail of Lean. Few Lean practitioners have actually achieved one-piece flow in their processes; at least not in their early years with Lean. For some, achieving one-piece flow is incomprehensible given their current state of affairs. Others will argue that one-piece flow does not apply to their industry.

Those committed to achieving continuous flow tend to fall into one of the following traps:

M11: Pursuing a one-size-fits-all solution to production planning and control,
M12: Forgetting to reduce Kanban-driven supermarket inventories once established, and
M13: Preconditioning continuous flow to the waste elimination.

Mistake 11 is committed when Lean practitioners disregard the particulars of their operations – high-volume/low-mix, high-mix/low-volume, or hybrid – and attempt to apply a text-book Lean solution to their production needs.

Our conversation with the manufacturing manager of a medical devices company exemplified Mistake 12. Sharing one of his insights he said, "We spent a lot of effort converting our MRP-driven production floor

"After we set up Kanban-driven supermarkets throughout the different workstations, we were tempted to celebrate our Lean victory. It was then that we realized we had merely organized our work-in-process inventory and that we were as 'fat' as we were before the supermarkets were established."

into a pull-driven operation. After we set up Kanban-driven supermarkets throughout the different workstations, we were tempted to celebrate our Lean victory. It was then that we realized we had merely organized our work-in-process inventory and that we were as 'fat' as we were before the supermarkets were established. The actual pursuit of reducing inventory had not started!"

Here, once more, the typical confusion between means and ends surfaces. Lean techniques are nothing more than an excellent vehicle to drive an organization towards delighting customers with an optimum and efficient end-to-end process. Organizations that loose sight of this outcome are left spinning wheels in the plethora of Lean tools.

The third mistake related to Flow entails, as Mistake 12 does, a technical angle within Lean theory. Most Lean implementations precede an effort towards establishing continuous flow with significant incursions in waste elimination. The argument is that unless a process is free of waste, establishing continuous flow will be difficult. The claim is not completely unsubstantiated.

However, under certain circumstances — such as in high-volume/low-demand-variability production lines — the inverse approach may be more effective: level the demand at the production line, gradually migrate from a batch processing scheme to a continuous flow scheme, and use the benefit of repeatability to eliminate waste.

The broader issue to be emphasized here is the importance of moving beyond a monolithic approach to Lean. Lean champions that take the time to study the intricacies of Lean discover a pallet of approaches not available to the typical practitioner.

Strategy and Competitiveness

We conclude our list with two common mistakes that relate to strategy and competitiveness. These are:

M14: Believing you will achieve a Lean transformation applying Lean tools, and

M15: Betting your strategy on Lean.

As we've already mentioned, Mistake 14 happens when Lean practitioners become captivated by Lean tools and forget that they are a means, not an end. We recall a conversation with an industrial engineer in a food processing plant. "It felt like whoever knew more Japanese words was the coolest—kaizen, kanban, gemba, muda, poka yoke, heijunka. It actually became annoying. Managers didn't lose time showing off their new vocabulary but, deep down, they didn't know what they were talking about!"

During our research, we also found that practitioners who focused exclusively on Lean tools and forgot to complement their technical approach with a psycho-social

change management effort, experienced, at best, short-lived improvements.

Finally, managers that commit Mistake 15 discover—hopefully sooner than later—that operational excellence is a necessary but insufficient condition for business success. By placing all their bets on Lean and forgetting to reassess their value proposition, they risk finding themselves running a very efficient but irrelevant operation. Lesson learned: Lean is definitely not a substitute for strategy!

Exploitation and Exploration

There is a fundamental difference between how Lean practices developed in Toyota and how Lean practices have been adopted throughout the rest of the world. This difference is at the root of most of the mistakes we've covered.

Toyota, through necessity, developed Lean adopting an exploration framework. While they didn't start from scratch — they imported practices from various fields and disciplines — a lot of experimentation and learning went on as they designed and put together the Toyota Production System (the body of knowledge that we refer to, today, as Lean). Hence, exploring what worked and what didn't was instrumental.

Of course, as Lean matured into a discipline in and of itself, and was deployed throughout the Toyota enterprise, they adopted an exploitation framework. The practices were now known, so it was a matter of adopting them and exploiting their benefits.

Common Themes Behind the 15 Mistakes

The 15 most common mistakes in lean implementations can be classified under the following broader themes:

Context Dropping	Failing to See the Invisible	Going for the Quick-Fix
Failing to consider situational elements and particular operational variables when deploying Lean tools and techniques.	Implementing Lean practices superficially and ignoring the investment required to develop process knowledge and nurture a continuous improvement culture.	Using Lean as a substitute for cost-reduction. Applying Lean techniques while ignoring the theoretical underpinnings of Lean operations management.
EXAMPLE: Using text-book demand leveling techniques developed for high volume products in low-volume/high-mix production lines.	EXAMPLE: Mechanically cleaning and organizing equipment and tools during a 5S exercise while ignoring the need to help employees learn how to learn.	EXAMPLE: Substituting the systematic identification and elimination of waste with indiscriminate cost-cutting.
Lesson Learned "Text-book" solutions and "best-practices" need to be customized and configured to fit your organization's operational profile.	Lesson Learned Understand the true essence behind the Lean tools and techniques. Understand the role *learning* plays in a Lean implementation.	Lesson Learned Unless people learn, expand their understanding of work, and increase their operational knowledge, improvement will be fleeting and short-lived.

However, the importance of exploring and learning remained ingrained in Toyota's DNA and became a fundamental foundation of the Toyota Production System.

Today, most organizations approach Lean from an exploitation framework. One of the Lean champions we interviewed told us, "Initially, we saw Lean as a set of proven practices we needed to adopt. If any learning went on, it had to do with how to use and deploy the tools. Adoption of practices was mechanical. It took us some time to realize the importance of inserting every experience into the Plan-Do-Check-Act learning cycle; to learn that Lean was all about iterations."

The word "iterations" captured our attention. To paraphrase Francis Bacon's magnificent insight in his masterpiece Novum Organum: *Nature, to be commanded, must be obeyed;* we propose that *Lean, to be exploited, must be explored*.

The focus on exploitation is at the root of all of the most common mistakes. This root cause manifests itself in many ways, such as context dropping, failing to see the invisible, and going for the quick fix (see box, Common Themes Behind the 15 Mistakes, page 11).

The Value of Mistakes

We believe that the most important lesson learned by the managers and practitioners we interviewed is that leading a Lean transformation is a learning process; Lean and learning go hand-in-hand. Without new knowledge, a system can not improve. Lean provides a roadmap and the framework for the discovery and deployment of new knowledge.

Within this context, mistakes are not necessarily bad. They are the currency of new knowledge. Mistakes fuel the learning process and can be a catalyst for change and improvement. Most of the companies we visited have learned from their mistakes and are successfully treading along the path of continuous improvement.

Rather than a checklist to be accounted for, we invite you to consider this inventory of typical mistakes as a platform to launch your own Lean exploration and learning experiences. As you initiate your organization in the ways of Lean, you will start to pave the way towards a productive continuous improvement adventure.

Ulises Pabon

(ulises@qbsteam.com) is Chief Operations Officer at QBS, Inc.; a management consulting firm focusing on strategy formulation and deployment, organizational design, innovation and process improvement methodologies, and organizational transformation.

QBS
QUALITY FOR BUSINESS SUCCESS INC.

MCS Plaza Suite 1210
255 Ponce de Leon Ave.
San Juan, Puerto Rico 00917
787-758-1003 • www.qbsteam.com

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