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## **A Manager's Guide To Implementing Lean**

A true convert to the lean production system that originated in Japan is the company Worldwide Business Solutions. The concept was not originally known as lean, but as just-in-time production, developed by Taiichi Ohno and a small team of zealots at Toyota.

One of the original founders of the Consultancy Group, Joseph Turnbull speaks about the process of implementing a Lean Business System.

Thousands of Western World manufacturers are considering implementing lean as a business and production management system. It likely will be essential for survival in a brutally competitive world that is moving quickly to a build-to-order environment. But they are not finding it easy. A good 50% of projects started fall along the wayside and are shelved as yet another failed investment.

Lean pioneer Joseph spoke with the Managers for action editor Peter Abrahamsen about the process of implementing a lean business system. Here is what he had to say.

**Question:** Why is it taking so long for lean production to take root in the Western World?

**Turnbull:** There were a few greenfield operations that were brought over from Japan that were already lean, but the people that brought them here hired new employees who didn't have "brownfield" attitudes. They purposefully hired people who were intelligent and team oriented but who did not have any prior manufacturing experience.

The hard part of implementing lean isn't so much that it's intellectually difficult; it's that there are a bunch of key principles that are fundamentally opposite of the way you do things in mass or batch production. The more experience you have in manufacturing, the harder it is to do lean.

When the revolution started in the west in the late 1980s, it was very experimental. Even today, leaving out the organisations like Toyota and some of its suppliers that brought the system with them, there are very few organisations that have stuck to it long enough really to show the potential of what is properly called a lean enterprise, where they have applied it throughout production and the administrative sides of the business.

**Q: Why have so few companies adopted lean?**

**Turnbull:** Part of it is the program-of-the-year phenomenon. There is also the problem that whenever there is a new CEO or a division president, they feel they have to put their mark on things, which is typically a two or three year phenomenon. A lean enterprise conversion is something that takes about a decade.



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The good news is that every year you make significant progress in cost, quality and delivery. But to become really lean is a very long journey.

**Q: What are some companies that you classify as being lean?**

**Turnbull:** There are very, very few. There are a few approaching lean. I'd put Nissan today as approaching lean. They are making 5 times as many cars than they were a decade ago -- a 500 percent output increase. That is the kind of metric that is possible with a full-scale lean conversion.

**Q: What are some of the difficulties in starting a conversion away from batch and queue to flow manufacturing?**

**Turnbull:** We have a mindset that if you apply a tool, you've done it and you're done. So we go in and build cells, apply standard work and typically get on each pass a 40 percent productivity gain. But to get the 400 percent gain you have to pass it at least 10 different times. You must restudy the process over and over.

That is a counter-intuitive thing. People say the words continuous improvement, but we just don't believe in continuous improvement. The idea that you can take a series of tools and apply them again and again to the same area and every time you apply them you find new levels of waste and new ways to improve doesn't feel right. If you take 10 firms that started on lean, eight of them quit after the first pass because they got a significant improvement of 40 percent. They thought that was the end of the journey. It's a small number that have actually learned the lesson that if you keep applying the tools the gains keep coming.

Q: What compelled you to take an interest in the lean principles of production?

**Turnbull:** In the late 80's, I came across the company Yanmar Diesel while reading about them in a magazine, they make farm tractors used in Japan. The story started during a management review meeting of the whole senior staff of the company, they went through the improvement they made on a firm-wide basis in three years and they described a doubling of output per person and a reduction in average unit costs of 28 percent. All this was achieved on the back of an oil crisis in which so many production industries faded away.

At the same time, they were producing four times as many product models because they were trying to grow their way out of the recession with proliferation. So their job got four times as hard but they got twice as productive and reduced their unit costs by 28 percent. That was just mind-boggling to me as a manufacturing guy. It caught my attention. I thought, "Wow, how could they do that in such a small time frame."

I found that they were a related cousin with the Toyota group of companies and Taiichi Ohno, who had developed the Toyota Production System, had been visiting them every once in a while saying, "You ought to try this new production system we're developing."

When the oil crisis just about sunk them, they decided to try it. Ohno and a couple of guys from the Autonomous Study Group, which was a group of internal Toyota



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and Toyota subsidiary people that Ohno selected to help him develop the system, decided to help them out.

I was very intrigued by what I had read about Yanmar and was trying to understand how it worked and I figured the automotive industry would be closer to it than anybody else.

A few years later I was involved in a benchmarking exercise of 144 companies in Japan and what we found was that 25 percent of them operated on a totally different planetary system from what we were used to.

The western world companies, at the time, and even now, still rate themselves as pretty good benchmarks. Firms making identical products are running at 400 percent of Western World productivity levels and 10 times our inventory turns and one-tenth our defect rates. These were huge, order-of-magnitude differences.

One of the shocks is that they weren't just four times as productive in the factory. It was found that they were on average four times more productive in all the staff departments when you measured in terms of company sales per person in the finance department.

The worst thing about it is, Yanmar Diesel were not even calling themselves Lean.

I began to realise that the nugget of a lean enterprise was the Toyota Production System and its evolution into being a business system that affected the administrative areas and product development and those kinds of functions.

This is where it all started for me.

**Q: What are some of the key lessons you learned from them?**

**Turnbull:** I've learned that learning the techniques take a long time but is only about half the battle. The management of the process has some really unique characteristics that most of the people at Toyota don't realise any more because Ohno fought through those battles 30 years ago. They've forgotten that they had to battle in order to get it in place. There are some key managerial lessons about implementing this that are still not very well known and still cause almost everyone who embarks on it to run into the same issues because they are inherent with the difference in the process.

**Q: What are some of the common problems?**

**Turnbull:** Little things like one-piece flow. What you find is people will build a cell and then you'll find batches at each machine within the cell. There are little piles of inventory. The operators feel comfortable with that because that is how they grew up. The supervisors know they've always had inventory between the machines. And everybody is afraid to take it out.

I have to admit that after having been a student of this it still took me two years of running and improving cells before I made the leap and actually went to a true one-piece flow.



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That then leads to another Toyota philosophy called making the waste visible. It sounds mundane, but it means that the system is designed so that if you implement it but you don't follow up on it, you shut your factory down.

One-piece flow forces the cell to stop functioning until you solve a lot of quality, set up and tool change problems.

It feels so painful, you say this can't be right and yet that's what it is intended to do. The whole idea is to make it so painful to leave all of those problems unresolved that it pushes you to solve those problems.

**Q: You're taking two steps backwards to go one step forward. It must be disconcerting.**

**Turnbull:** Fundamentally, it just feels wrong both to the production workforce and the management team because they have all been trained in a different system. You go through the whole conversion process and there are a whole bunch of things like that.

**Q: What are some others?**

**Turnbull:** As a rule of thumb, you should go back to each area at least every other year or once a year if you're on a faster pace and apply all of the tools again and make another round of improvement. This leads you to rethink what sort of organisation you need to have if you're going to maintain that sort of improvement pace.

**Q: What is the most difficult aspect of managing a conversion?**

**Turnbull:** Ohno talked about an organisation being like the human body and that a human body is designed to be self protective. There are antibodies inside the body. When a foreign substance enters the body -- an infection -- the antibodies not only get more active they also multiply. Ohno says an organisation operates the same way.

The antibodies create a company's culture. The stronger the culture, the stronger the antibodies because they define what a company will do and also what it won't do.

When you start a conversion like this, you're redefining your company culture in terms of what you will and won't do. The people who are the most loyal members who you know love the company will be some of the biggest resisters of the process because they are trying to protect the company as it has been as opposed to how the company will be. You need to actively address that group or their efforts to protect the corporate culture will defeat any effort to change the culture in a way that will allow you to become a lean enterprise.

**Q: It takes strong leadership to overcome such resistance to change.**



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**Turnbull:** And leadership always is in short supply. There is little reward for it and a lot of risk.

**Q: Yet you still see many case studies of companies that have adopted lean and experienced dramatic improvements in every measure.**

**Turnbull:** If I look at firms that are lean, it's about 5 percent of manufacturing employers Worldwide and two percent of these are transplants like Toyota and its subsidiaries. So it's perhaps 3 percent -- and that might even be a stretch. Many companies gained high percentage results in the 1990's, but stopped once achieving the results, never sustaining a continuous improvement process to drive the company to become World Class.

**Q: Not even the people at Toyota feel like they have even come close to achieving their goals, and they've been at it for 50 years.**

**Turnbull:** The key to doing this is having an attitude that you can always be better tomorrow than you are today. They have these tools and every time they apply them they improve their operation. They are already way out in front because of the attitude that they have a long way to go. In the end perfection is what we aim for but it something mankind can never achieve.

**Q: If they're in front now and have been for so long, what happens to other Automotive companies?**

**Turnbull:** It takes a long time for a huge company to erode. I was told recently that Toyota has more cash in the bank than the market capitalisation of General Motors. That tells a story. There is a lot of hubris around the old-line former leaders. It's part of the company culture that prevents them from accepting lean because it wasn't something that Sloan developed and it wasn't something that was part of the GM way. There is no one willing to say, "We need to become a new GM." There isn't even the recognition that they need to change. It's absolutely mind-boggling.

**Q: What advice do you have for a company that is considering implementing a lean system?**

**Turnbull:** You first need to point out to the organisation that it needs to change and that staying as it is a recipe for long-term disaster. The second is to find a good master teacher or sensei to keep you away from the big roadblocks. Then get a good value-stream based map and plan. The fourth is to build a supportive organisational structure.

We have some rules of thumb that say 3 to 5 percent of the employees at a site should be committed full time to improvement. From our experience it takes about that level of commitment to review every process every two years. We recommend one person at a site be committed and then for every five people you free up reinvest one in the process until you get to that 3 to 5 percent level. Those are the folks you leave to focus on this set of tools until they become your internal sensei.



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You need to stick with it for five years and over time they will touch every part of the organisation.

The one thing you see missing from most companies trying to do this is they don't build a structure to sustain it. When you think about it, we are all fighting fires. That is how we manage. We don't do anything that addresses the root cause because that would take time.

You have to take resources and say, "You are not allowed to fight fires, you're only allowed to work full time on root cause improvement projects." If you don't do that, then all of your improvement resources get sucked back into today's fire fighting and you end up not making any fundamental root-cause improvement.

**Q: That seems to be the greatest difficulty for any organisation. They're all faced with a time crunch, running on a treadmill going 1,000 miles per hour, faster by the day.**

**Turnbull:** It's a huge discipline, because when you start, you're all working 12-hour days and you know that if you work a 14-hour day then tomorrow you'll still have the same pile of problems. We're not really driving them out structurally, changing our processes.

When you start off and say you are required as a site manager to assign your best person in the organisation to this role of lean development office, that is something that just feels wrong. It's another one of those feel-wrong things. Then when you say for every five people who come out of the events that are freed up, that the lean development office gets to add one more until they become 3 to 5 percent it is just hard to believe. Once you get the people in there, the temptation for most managers is to say, "We have to ship this product today, let's put them on the line today." It takes a rare discipline to get out of the batch production, fire-fighting mode.

I know a £50 million company that is growing and has a great business and it can't ship its products fast enough. If they applied lean it would create capacity that they just can't believe. But they can't get over the hurdle of we're too busy to think about adopting lean. The CEO doesn't have any basis on which to believe that it would be worth the effort to double their capacity in two years by applying lean. Intellectually, you can't convince him while he is sitting there, which is true with all of manufacturing: you have to show people.

**Q: How important are outside consultants in the process?**

**Turnbull:** There are so many mistakes you can make both on the management, learning and application of the tools themselves that if you don't have a good coach beside you, you're more likely to get shot down than you are to reach the end of the road.

You have to start at a single plant site and pick a product family and use value-stream mapping to look at where the time is wasted and where the value-added and non-value-added steps are in the process. That can give you a map of where to begin in terms of getting results.



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When you look at the value-stream map you can see where the non-value adding steps or the time consumption steps are big. With this operational map, you start applying the tools to the subsets within the value stream. You can decide to use Shingo's set-up reduction tools to reduce the set up time because that is why things are being held up, or you can put kanban in to link operations. The idea is to get it flowing.

Then the right thing to do is to restudy that value stream again and again so that the organization gets the lesson that, "We made huge improvements but when we went back, it got even better and when we went back again it got even better." You need to sink that logic in early on.

A common format of using these tools that came out of Toyota is to study a small sub segment of one area for a week and make a big improvement. If everyone knows that the goal is to have it be different at the end of one week, it creates a different environment as opposed to, "We're going to analyse it for several months and then do something."

If you count those weeklong periods of applying lean tools to any administrative or production process as a learning experience, it takes 50 or 60 of those before you actually begin to believe in most of the principles. If you can do one of those a month, which is a pretty good pace from following up on the last one and getting ready for the next, you're talking about five or six years before you believe in the basic principles and another three or four years before you are competent at using most of the tools.

Even though you know how to use them, you still may not be willing to put one-piece flow in place. This is why they use the idea of the sensei, which is a marshal arts concept. You must have a master teacher and you learn by doing. You don't go to classrooms. You go out and practice the exercise.

Lean is learned the same way. You go out in an environment where your processes are and you apply the tools. It is out of that process that you come to believe the process works.

**Q: With the manufacturing sector in a downturn, do you think companies are running out of time to start the process?**

**Turnbull:** The good news about the downturn is that more people are willing to seriously look at undertaking a lean journey.

**Q: Stock Markets richly reward the companies that undertake lean without realising it. Why isn't there much pressure from Wall Street to adopt lean?**

**Turnbull:** I always tell people who are considering the journey that they should just remember that their board of directors is a surrogate for Wall Street or the FTSE and will only judge the process by the financial numbers.

You need to drive cost, quality, delivery and you need to make sure it shows up on the income statement and the balance sheet.



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**Q: Isn't that hard to do, especially early in the process?**

**Turnbull:** When you start the process it takes a lot of energy and most of the organisation will give you some level of support for improving quality and delivery. But in the end, productivity growth is the one that drives margin improvement and increases wealth, and you find out that nobody wants to do that. There are all kinds of dynamics you have to deal with. Those on the administrative side don't even think productivity is a relevant measure for them, and they don't want anything to do with it.

You have to push pretty hard on the results and at the same time you have to make sure that people are putting the infrastructure in and are using the tools. It can be uncomfortable, and most people will just pass on that discomfort unless there is some form of pressure. I use the results as pressure.

**Q: Do you need hard managers to make it happen?**

**Turnbull:** When you start in a new organisation, one way or another, you have to make sure that everyone in the organisation and especially the antibodies know that their choice is to join up with this new way or find a different organisation. Most managers are very much afraid of making that decision. There are not many people willing to do that.

**Q: Do you think it is inevitable that manufacturing will evolve to a lean system?**

**Turnbull:** If you look at the history of mass production, it took about a generation after the idea started for it to be accepted. After Ford, it was about a generation -- 25 to 30 years -- before GM and the others were on the same page and then it was another generation -- post World War II -- before the European auto manufacturers really adopted mass production.

If you're in an industry and one firm in the industry adopts lean, they'll end up dominating the industry and other people will either have to do it or fall out of the industry.

**Q: If Western World manufacturers start adopting lean, do you think it will lead to a revival of Western World manufacturing?**

**Turnbull:** With lean, you end up with an extremely flexible and responsive company so that you can do things with delivery performance that were not possible at a long distance from your customers. That becomes a marketing advantage.

Using lean, you can get to daily production where they make every product every day by going through reducing set up times, a la Shingo's methodology. At Cummins you can call up an operator in the cell and order product for the next day and it will be shipped the next evening.

When you start, it seems impossible but when you finish you realise it's pretty straightforward.



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