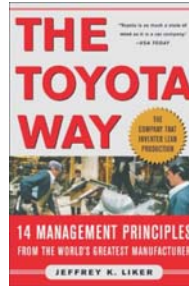




THE TOYOTA WAY

14 Management Principles from the World's Greatest Manufacturer



Author: Jeffrey K. Liker

Publisher: McGraw Hill

Date of Publication: 2003

ISBN: 0071392319

Number of Pages: 330 pages

■ About the Author



Jeffrey Liker

Dr. Jeffrey K. Liker is Professor of Industrial and Operations Engineering at the *University of Michigan*. He is the Director of the *Japan Technology Management Program* (JTMP) and co-Director of the lean manufacturing program at the University of Michigan that offers a 10-day lean manufacturing certificate and a five-day lean product development certificate. Dr. Liker has authored or co-authored over 65 articles and book chapters and five books. He is also the Editor of *Becoming Lean: Experiences of U.S. Manufacturers* (Productivity Press, 1997), winner of the 1998 Shingo prize (for excellence in manufacturing research). He is active as a keynote speaker, speaker for executive retreats, and lean consultant, independently and through a company he cofounded -- Optiprise, Inc. Recent clients include G.M., Ford, Intier, PPG Industries, Johnson Controls, Tenneco Automotive, Framatome Technologies, Northrop Grumman Ship Systems, Jacksonville Naval Air Depot, and Portsmouth Naval Ship Yard.

■ The Big Idea

Toyota first caught the world's attention in the 1980s when consumers started noticing that Toyota cars lasted longer and required fewer repairs than American cars. Today, the company is the world's most profitable car manufacturer, consistently producing high-quality cars using fewer man hours and less on-hand inventories. To this day, Toyota continues to raise the bar for manufacturing, production development and process excellence.

The Toyota Way explains the management principle and business philosophy behind Toyota's success. It narrates Toyota's approach to Lean Production (known as the Toyota Production System) and the 14 principles that drive Toyota towards quality and excellence. The book also explains how you can adopt the same principles to improve your business processes, while cutting down on operations and production costs.

■ The World Class Power of the Toyota Way

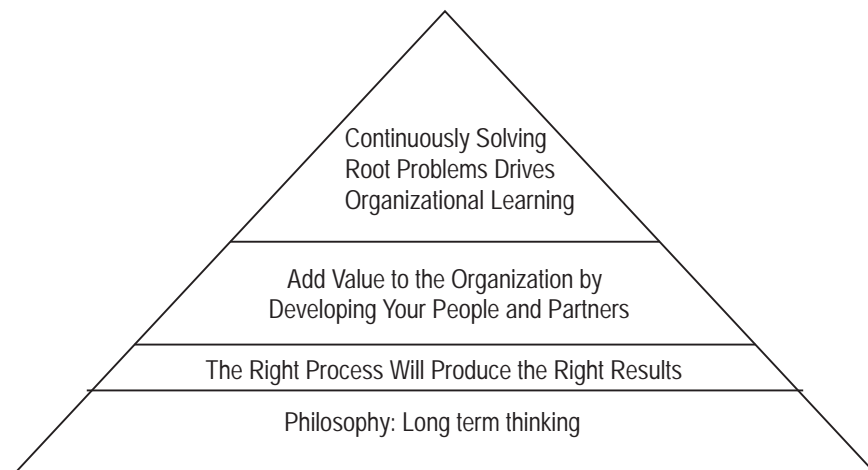
The Toyota Way: Using Operational Excellence as a Strategic Weapon

The Toyota Production System (TPS) and Lean Production Toyota invented Lean Production in the 1940s and 50s. The company focused on eliminating wasted time and material from every step of the production process (from raw materials to finished goods).

The result was a fast and flexible process that gives the customers what they want, when they want it, at the highest quality and most affordable cost. Toyota improved production by:

- Eliminating wasted time and resources.
- Building quality into workplace systems.
- Finding low-cost and yet reliable alternatives to expensive new technology.
- Perfecting business processes.
- Building a learning culture for continuous improvement.

The “4P” Model of the Toyota Way



How Toyota Became the World's Best Manufacturer

Toyota developed the Toyota Production System (TPS) after World War II. While Ford and GM used mass production and economies of scale, Toyota faced very different business conditions. Toyota's market was very small but it had to produce a variety of vehicles on the same assembly line to satisfy customers. The solution: making the operations flexible. This resulted in the birth of TPS.

TPS borrowed some of its ideas from the United States. The core idea of the *Just in Time (JIT) system* came from the concept of the “pull-system”, which was inspired by the American supermarkets. In the pull system, individual items are replenished as each item begins to run low on the shelf.

Applied to Toyota, it means that the first step in the process is not completed until the second step uses the materials or supplies from Step 1. At Toyota, every step of the manufacturing process uses *Kanban* to signal to the previous step when its part needs to be replenished.

The company was also inspired by W. Edwards Deming. Aside from broadly defining customers to include internal and external clients, he also encouraged Toyota to

adopt a systematic approach to problem solving, which became a cornerstone for continuous improvement (known as *Kaizen*)

The Heart of the Toyota Production System: Eliminating Waste

The point of the TPS is to minimize time spent on non-value adding activities by positioning the materials and tools as close as possible to the point of assembly.

The Major types of non-value adding waste in business or production process are:

1. Overproduction.
2. Waiting or time on hand.
3. Unnecessary transport or conveyance.
4. Over processing or incorrect processing.
5. Excess inventory.
6. Unnecessary movement.
7. Defects.
8. Unused employee creativity.

■ The Business Principles of the Toyota Way

Principle 1: Base your management decision on a long-term philosophy, even at the expense of short-term financial goals

The Toyota message is consistent: *Do the right thing for the company, its employees, the customer and the society as a whole.* This long-term philosophy is the guiding post of the company in its continuous quest to offer the best in quality and service to its customers, employees and stockholders.

Long-term goal should supersede short-term decision making or goals. Develop, work, grow and align the company towards a common goal that is bigger than making money. Your philosophical mission is and should be the foundation of all your other principles.

Toyota is aligned around satisfying the customer. It believes that a satisfied customer comes back and gives more business through referrals. It generates value for the customer, the society and the economy.

One of the keys to success of Toyota is that it lives by the philosophy of self reliance and a "let's do it ourselves" attitude. This can be best illustrated when it ventured into the luxury car industry. It did not buy a company that already made luxury cars. Rather, it created its own luxury division - the Lexus - from scratch in order to learn and understand the essence of a luxury car.

Principle 2: Create continuous process flow to bring problems to the surface

The mass production system used by many manufacturers assures overproduction in large batches which in turn guarantees inventory being idle and taking up a lot of

plant space. Toyota's lean production system has redesigned the work process to move both materials and information faster.

To optimize the flow of materials so that it would move quickly, Toyota reduced batch sizes and came up with work cells that were grouped by product rather than by process. The continuous process flow links the process and the people together so that if a problem surfaced, it can be solved right away.

Benefits of the one-piece/continuous process flow

1. Builds in quality.
2. Creates real flexibility.
3. Creates higher productivity.
4. Frees up floor space.
5. Improves safety.
6. Improves moral.
7. Reduces cost of inventory.

Principle 3: Use the “Pull-System” to Avoid Over Production

The pull-system hinges on the idea of restocking inventory based on the day-to-day demand of the customers rather than on a fixed schedule or system. This calls for a flexible system that relies on consumer demand.

The Just-in-Time (JIT) system provides customers with what they want, when they want it and in the amount they want it. Material restocking based on consumption minimizes work in process and warehousing of inventory. You only stock small amounts of each product and frequently replenish based on what the customer actually takes away.

Principle 4: Level out the Workload (*heijunka*)

A strict build-to-order system builds a lot of inventory, over-head cost, poorer product and service quality and hidden problems. To eliminate this problem, Toyota came up with a scheme of leveling out the production schedule.

The leveling of production by volume and product mix is known as heijunka. The process does not build up products according to the actual flow of customer orders. Rather, it takes the total volume of orders in a period and levels them out. This results to having the same amount and mix made each day

Benefits of a Leveling Schedule

1. Flexibility to make what the customer wants when they want it.
2. Reduced risk of unsold goods.
3. Balanced used of labor and goods.

Principle 5: Build a Culture of Shopping to Fix the Problem, to Get the Quality Right the First Time

Quality for the customers should be the driving force behind any company's philosophy. Quality should be built in your company and your production processes. Building an Early Warning Device into your line or equipment prevents problems from being passed down the line. This reduces costs and is more effective than inspecting and repairing quality problems after the fact.

You should also build a support system that can quickly solve problems and create counter measures. The development of a company principle of stopping or slowing down work when a problem is detected and getting the quality right enhances productivity and profitability in the long run.

Principle 6: Standardized Tasks are the Foundation for Continuous Improvement and Employee Empowerment

Standardization is the foundation for continuous improvement, innovation, growth and quality. It is impossible to enhance any process until it is standardized. Quality is likewise guaranteed through standard procedures to ensure consistency in the process and product.

When implementing standardization, it is important to strike a balance between providing the employees with firm procedures and providing them the freedom to innovate and be creative. Standards should be specific enough to offer useful guidelines yet general enough to allow for some flexibility.

Principle 7: Use Visual Control So No Problems are Hidden

Five S's for Elimination of Waste

1. Sort. Keep only what is needed and dispose of what is not.
2. Straighten. Maintain orderliness. Remember, there is a place for everything and everything in its place.
3. Shine or cleanliness. The cleaning process often acts as a form of inspection that can identify defects or abnormal conditions that can affect quality.
4. Standardize or create rules. Develop systems and procedures to maintain and monitor the first three rules stated above.
5. Sustain. Maintaining a stabilized workplace is an ongoing process of continuous improvement.

Principle 8: Use Only Reliable, Thoroughly Tested Technology that Serves Your People and Process

Adaptation of new technologies must support your people, process and values. It must not displace or replace them. Introduce new technology after it has been tested and proven with the involvement of a broad cross-section of your organization.

Before adopting any new technology, Toyota first analyzes the impact it might have on existing processes. If it determines that the new technology adds value to the existing process, it analyzes it further to determine if it does not conflict with the company's philosophy and operating principles. If it violates any of the principles,

Toyota rejects the new technology.

The introduction of new technology is done through a process of consensus, analysis and planning involving the employees and all the stakeholders in the process. This painstaking process results in the smooth implementation of the new technology without employee resistance and process disruption.

Principle 9: Grow Leaders Who Thoroughly Understand Your Work, Live the Philosophy and Teach it to Others

Grow leaders from within the organization rather than getting them from outside.

Toyota never “pirates” Presidents or CEOs from other companies. Instead, the company looks for its key leaders within the organization - in sales, product development, manufacturing and design. Toyota's philosophy of promoting and acquiring mid- to top-level executives within the company stems from the company's belief that they are eliminating unevenness (*muri*) at the executive level.

Changing the culture every time a new leader comes in brings some confusion in the ranks as suddenly, employees have to adjust to new “rules”. It also does not develop any real depth or loyalty from the employees.

Toyota believes that the leaders within their organization must live and understand the Toyota culture everyday. They also expect their leaders to train subordinates on how to understand and live by the Toyota way.

Principle 10: Develop Exceptional People Who Follow Your Company's Philosophy

Use and understand motivation theory.

Toyota uses a different motivation theory to motivate and inspire its employees to strive for excellence.

1. Maslow's Need Hierarchy theory of satisfying lower level needs and moving employees up the hierarchy towards self actualization. Toyota's approach to good pay, job security and safe working conditions satisfy employee needs. Toyota's culture of continuous improvement supports growth towards self actualization.
2. Herzberg's Job Enrichment theory of eliminating “dissatisfiers” and designing work to create positive satisfiers was the basis of developing the 5 S's, ergonomic programs, visual management and human resources policies to address hygiene factors. Toyota's continuous improvement, job rotation and built-in feed back support motivators act as positive satisfiers.
3. Taylor's Scientific Management theory calls to scientifically select and design standardized jobs, as well as train and reward performance relative to performance. Toyota follows all scientific management principles at the group level rather than individual level based on employee involvement.

4. Behavior Modification theory calls for reinforcement of behavior Toyota's continuous flow creates shorter lead times for rapid feedback. Problems are addressed quickly and leaders are constantly on the floor to provide reinforcement.
5. Goal Setting theory calls for setting specific, measurable, achievable challenging goals. Toyota sets goals that meet these standards through *hoshin kanri* (policy development).

Principle 11: Respect Your Extended Network of Partners and Suppliers by Challenging Them and Helping Them Improve

Treat partners and suppliers as an extension of your business.

Toyota maintains the principle of partnership. The company views its suppliers as partners in the business. Just as Toyota challenges its people for excellence and improvement, it also challenges its suppliers.

According to the author, supplier development includes a series of aggressive targets and challenges. Suppliers will want to work with the company because they know that they will improve themselves and develop respect among their peers and other customers.

Toyota always views new suppliers with caution, giving very small orders. However, once the supplier earns the trust of the company, and proves that they are sincere in their commitment to meet Toyota's standards for cost, quality and delivery, Toyota will adopt them into the company and teach them the Toyota way. Supplier relationships and partnerships are usually long term and it is seldom that a supplier is replaced except for the most egregious behavior.

Principle 12: Go and See For Yourself to Thoroughly Understand the Situation (*Genchi Genbutsu*)

Think and speak based on personally verified information and data.

Go and confirm the facts yourself. Remember, you are responsible for the reports and information you provide others. Solve problems and improve processes by going to the root or source and personally observing and verifying information and data.

It is important not to speculate on the basis of what you heard and what other people have told you. When you go and see things for yourself, you will have a better grasp of the situation.

Principle 13: Make Decisions Slowly by Consensus, Thoroughly Considering All Options; Implementing Decisions Rapidly

The consensus process helps broaden the search for solutions and makes implementation of decisions more quickly.

For Toyota, how one arrives at the decision is equally important as the quality of the decision. Do not hastily make a decision without covering all the facts, alternatives and consulting with the people who will be affected with the outcome of the decision. When you have picked a solution or alternative, go down the path quickly but cautiously.

Consultation can make acceptance of the solution easier and implementation of the process more smoothly. Toyota's excellence is in the details. The company considers all elements (cost, quality, problems, solutions and stakeholders) in the process.

The 5 major elements to thoroughly consider in the decision making process are:

1. Finding out what is really going on.
2. Understanding the causes of the problem. Asking "why" five times.
3. Broadly considering alternative solutions and developing a detailed rationale for the preferred or selected solution.
4. Building consensus with the team, employees and suppliers.
5. Using effective and efficient communication channels to convey steps one to four.

Principle 14: Become a Learning Organization Through Relentless Reflection (*Hansei*) and Continuous Improvement (*Kaizen*)

- Establish a process for continuous monitoring and continuous improvement. Once you have set-up a standard and stable process, use continuous improvement tools (such as the balance score card) to find the root cause of inefficiencies and apply effective counter measures.
- Create a process that requires the least (or if possible, zero) inventory. This will make wasted time and resources easier to spot and correct.
- Protect industrial knowledge by developing stable employees, slow promotion, continuous learning, and a very careful succession system. Train employees to become leaders and effectively handle work. Promote people within the organization.
- Standardize the best process with each new project and each new manager.

■ Applying the Toyota Way in Your Organization

Using the Toyota Way to Transform Technical and Service Organizations

Developing and Implementing Value Stream Maps through Kaizen Workshops

Phase 1: Preparation for the Workshop

1. *Clearly define the scope.* Determine the starting point or trigger and the final deliverable products to the customer.
2. *Set objectives.* Set measurable objectives for the team to achieve. The goals must be aligned with the company culture and should be set to reduce lead time, improve quality and reduce cost.
3. *Create preliminary current state map.* Have a team of 3 to 4 participants walk

through the current process. Take note of the time it takes to perform the task and the wait times between processes. This is the most crucial of the pre-work activities as it saves valuable workshop time.

4. *Collect all relevant documents.* Aside from collecting the preliminary current state map, the team should also collect samples of forms and documents used at each step. Copies of all standard procedures must be made available during the workshop.
5. *Post a preliminary current state map in the team room.*

Phase 2: The Kaizen Workshop

1. *Who is the customer?* Have the team identify the customer's needs and the processes that support or add value.
2. *Analyze current state.* Analyze process steps and process flow. Identify value added and non-value added items. Eliminate the non-value add.
3. *Develop future state vision.* Brainstorm and have participants write down their ideas. Team should evaluate each idea and see which can help in achieving goals.
4. *Implementation.* Develop a training and communication plan.
5. *Evaluate.* Measure performance by establishing process metrics to visually track progress and for continuous improvement.

Phase 3: After the workshop - Sustaining and Continuous Improvement.

1. *Review the status of the open action items from the project plan.*
2. *Review process metrics to ensure improvements are being achieved.*
3. *Discuss additional opportunities for improvements.*
4. *Continue to improve the process.*

Build Your Own Lean Learning Enterprise, Borrowing from the Toyota Way

13 Tips for Transitioning Your Company to a Lean Enterprise

1. Start with action in the technical system; followed quickly with cultural change.
2. Learn by doing first and training second.
3. Start with the value stream pilots to demonstrate lean as a system and provide a "go see" model.
4. Use value stream mapping to develop future state visions and help "learn to see".
5. Use Kaizen workshops to teach and make rapid changes.
6. Organize over value streams.
7. Make it mandatory.
8. A crisis may prompt a lean movement, but may not be necessary to turn a company around.
9. Be opportunistic in identifying opportunities for big financial impacts.
10. Realign metrics with value streams perspective.
11. Build on your company's roots to develop your own way.
12. Hire or develop lean leaders and develop a succession system.
13. Use experts for teaching and getting quick results.