

# The Art of Designing and Producing Product for Facing Global Challenges: A Study on Toyota Production System

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## Abstract:

The purpose of this paper is to analyze the quality efforts made by Toyota and suggests appropriate strategic options to face global challenges and improve its problems. In order to do this a description of the quality theories used by automobile industry, such as the Toyota Production System (TPS), Kaizen, Just-in-Time (JIT), etc. has been discussed. The business world today is a very vast one and the management of many companies is looking out for ways in which it can make business more consumer oriented, secure a steady market outlet and steady supply of raw materials, increase consumer confidence, improve financial results, improve the working environment and emerge as superiors by designing and producing products and services over their competitors. Consumers today do not only want the right amount of a product or service but also look out for the right quality. Mindful of the above and a lot more, in this paper recommended some strategy to improve the quality problem of the Toyota keep in mind the quality tools and efforts has been used previously.

**Key Words:** Customer Satisfaction, Lean Production, Quality, Quality Management, Toyota Production System (TPS),

## 1. Introduction

In recent decades, although many companies have adopted management techniques to enhance their competitiveness, some of them realized the essential value of applying total quality management, a manufacturing management technique, to obtain and sustain competitive advantage, as well as support long-term success from customer needs to customer satisfaction. As a result, there is an accelerating interest in quality and quality improvements as a business strategy among the industries in the world. For instance, Toyota is always paying significant attention on operational excellence as a strategic weapon.

### 1.1. Purpose and Execution

The purpose of this report is to analyze the quality efforts made by Toyota and suggest appropriate strategic options to improve their problems. In order to do these firstly, introduce the history and growth of Toyota; Secondly, make a description of the quality theories used by the automobile industry, such as the Toyota Production System (TPS), Kaizen, as well as, Just-in-Time (JIT). The following step of the analysis will be to find out what and how quality tools have been adopted by Toyota on the basis of customer perspective, thirdly, explain the reasons why Toyota decided to use those quality tools, and the outcomes should also be taken into account. Finally, recommend some appropriate suggestions to improve the quality problem of the company.

### 1.2. Problem Definition

The Toyota Production System (TPS) has become a well-known philosophy, technology, and management tool, which were learned by many companies to achieve continuous improvement on production. According to Toyota, the heart of this system is human development, and it supports the elements of Total Quality Management from the following perspectives: people's needs (not only the customers', but also the employees') under the premise of quality efforts; and involving the quality into the production processes. In addition, it has a significant effect on the quality tools, such as Kaizen and Just-in-Time (JIT).

### 1.3. Company Background

Toyota, regarded as one of the world's largest auto manufacturers and widely recognized for its quality of products and production systems, can be traced back to 1867, while the inventor and a tinkerer, Sakichi Toyoda was born in a small village in present Kosai, Shizuoka, Japan. In 1926, he started Toyoda Automatic Loom Works, the parent firm of the Toyota Group. Nevertheless, Toyoda's car operations were placed in the hands of his son, Kiichiro Toyoda. It was the year of 1937 that Toyota Motor Co. was established as an independent and separate company.

Since the first Toyota Crown models imported in the USA in 1957, Toyota started its international business. In the early 1960s, Toyota was sold in Europe. In addition, the company increased its business rapidly in the 60's and 70's, and during the years between 1962 and 1972 it produced vehicles domestically from 1 million to 10million (Toyota Motor Corporation, 2009).

The essence of success for Toyota was its astounding quality reputation with continuous process improvements. The company first caught the world's attention in the 1980s, when it became clear that there was something special about Japanese quality and efficiency. During the 1990s, Toyota began to branch out from producing mostly compact cars by adding many larger and more luxurious vehicles to its lineup. Furthermore, today Toyota is far more profitable than any other auto manufacturer with global vehicle sales of over six million cars per year in 170 countries (Linker, 2004).

## 2. Literature Review

### 2.1. Quality

*Quality is the totality of features and characteristics of a product or service that bear on its ability to satisfy stated or implied needs*

*ISO 8402, ISO 9000(Gustafsson, 2009)*

### 2.2. Satisfaction

Finding new customers are more expensive than managing old ones. By fulfill customer needs and keeping them satisfied, customers are more likely to buy products from the same company in the next purchase situation. (Boles, Braksdale, & Johnson, 1997).

### 2.3. Kaizen

Kaizen consist of the Japanese word kai, which means change and zen meaning good. In other words, Kaizen can be describe as changing for the better (Bergman & Klefsjö, 1995) or the action to correct if the word is translated from Chinese(World Class Manufacturing).

**Kaizen - Table 1**

改	Kai
善	Zen

The Kaizen philosophy is to improve the quality and the process by small every day changes. Instead of the common western do-not-fix-if-it-not-broken philosophy, Kaizen stresses that everything can be made better, even if it is not broken. Kaizen should be continues process that involves everyone from the workers to top management and involves two steps:

- Analyze problems; and Generate solutions

### 2.4. Just in Time (JIT)

JIT is a manufacturing approach that aims to reduce over-production, queues, bottlenecks, excess transport and buffer inventory. The process intentions are to improve all performance variables such as cost, speed, durability and flexibility. Traditional systems isolate the system from the environment; JIT strives to create close liaisons with suppliers. JIT also stresses that the workforce can contribute to improve a process. Encouraging personal responsibility and process ownership from a multi-skilled workforce that proactively seeks solutions to problems can lead to more standardized production designs. JIT also involves creating effective plant layouts, reduction of set-up times, and eliminate places where inventory can be lost. The JIT technique is preventative rather than reactive maintenances. (Oxford Dictionary of Business, 2002).

### 2.5. 5S

According to (Gustafsson, 2009) the 5S strategy consist of five different steps; sort, set in order, shine, standardize, and sustain. By reducing time waste such as searching for missing parts or locating tools an operating time of a process can be reduced. The first step, sort, is to remove all unneeded tools, parts and supplies from the working area. When all unnecessary components are removed the remaining parts, tools etc., are sorted and given their own place (set in order). This will improve the process by reducing the employees search time for different items. The next step is shine, which simply means cleaning the working area. Constantly cleaning and putting things back in place obtain the two first steps. The fourth step is to standardize the process and create routines and methods for cleaning and sorting. These methods and routines should continuously be improved to smooth the work process. For example, tools and parts that are used often should be placed so they can be easily accessed. The final step is to sustain the 5S

improvements, the processes should be controlled and maintained in order to create a habit and the methods and routes should continually be improved. The 5S strategy also involves eliminating hazardous or dangerous conditions in the working area. (Gustafsson, 2009)

## 2.6. Lean production

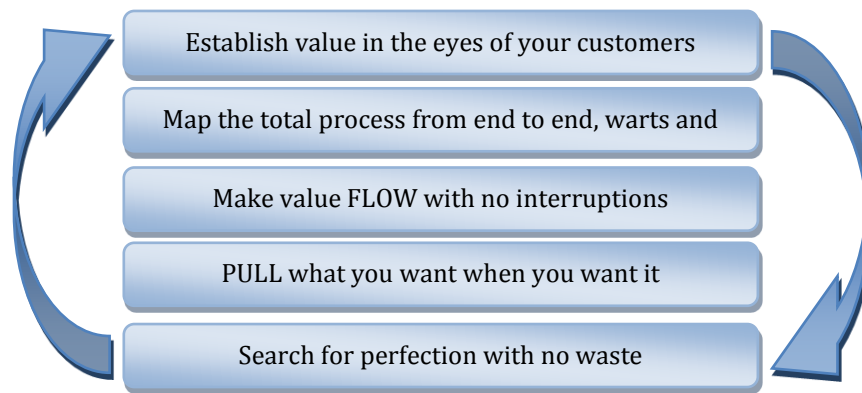
*“All we are doing is looking at the time line; from the moment the customer gives us an order, to the point when we collect cash. We are reducing that time line by removing the non-value-added wastes.”*

*Taiichi Ohno (Gustafsson, 2009)*

Lean production (lean thinking) or Toyota Production System (TPS) is a modern management philosophy, is a process-focused productions system with the purpose to reduce waste. The aim is to eliminate all non-value adding processes in the production. By reducing defective equipment, overproduction, loose inventories, time-motion lags, over-processing, over staffing, delivery issues, unreasonable floor space, surplus and material leftovers, quality losses, etc., the definitive idea is to reducing lead-times, improving quality, lowering production costs and thereby improving the results (World Class Manufacturing).

All processes have some kind of waste and therefore the lean thinking philosophy can be adopted and applied to other business operations in the manufacturing sector. In all places were wastes can be found the lean thinking approach can be developed and for that reason the whole process chain can be improved (World Class Manufacturing).

Lean Principles – Figure 1



(Gustafsson, 2009)

## 2.7. Six Sigma

If a system delivers a product with 99 percent accuracy, it will fail to deliver 10.000 units out of a million. The Six Sigma approach is an improvement program that aims for creating a process where the distance between the process average and the nearest tolerance limits should be at least  $6\sigma$  (Bergman & Klefsjö, 1995). Statistically this means the six sigma approach aims to achieve a quality of only 3.4 units. Out of a million deliveries only 3 or 4 units would be defective using the Six Sigma approach (Lovelock, Wirtz, & Singh Bansal, 2008).

Before, Six Sigma was only used to reduce defective units in a production, but today this approach has evolved to an overall business improvement tool (Lovelock, Wirtz, & Singh Bansal, 2008).

*“Six Sigma is a comprehensive and flexible system for achieving, sustaining and maximizing business success. Six sigma is uniquely driven by close understanding of customers’ needs, disciplined use of facts, data and statistical analysis, and diligent attention to managing, improving, and reinventing business processes.”*

*(Pande, Neuman, & Cavanagh, 2000)*

The Six Sigma model can be used in two different strategies. The first strategy is process improvements where the delivery processes are enhanced by identifying and eliminating the cause for the problems. If the problem can be identified or the cause cannot be eliminated, the second strategy has to be used, namely process design/redesign. This strategy works as a supplement to the process improvement strategy and instead fully addresses the root of the problem by redesigning the process (Lovelock, Wirtz, & Singh Bansal, 2008). The different steps in both strategies are shown in the Table 2 below.

**Six Sigma - Table 2**

	<b>Process Improvement</b>	<b>Process Design/Redesign</b>
<b>Define</b>	<ul style="list-style-type: none"> <li>Identify the problem</li> <li>Define requirements</li> <li>Set goals</li> </ul>	<ul style="list-style-type: none"> <li>Identify specific or broad problems</li> <li>Define goal/change vision</li> <li>Clarify scope and customer requirements</li> </ul>
<b>Measure</b>	<ul style="list-style-type: none"> <li>Validate problem/process</li> <li>Refine problem/goal</li> <li>Measure key steps/inputs</li> </ul>	<ul style="list-style-type: none"> <li>Measure performance to requirements</li> <li>Gather process efficiency data</li> </ul>
<b>Analyze</b>	<ul style="list-style-type: none"> <li>Develop causal hypothesis</li> <li>Identify root causes</li> <li>Validate hypothesis</li> </ul>	<ul style="list-style-type: none"> <li>Identify best practices</li> <li>Assess process design</li> <li>Refine requirements</li> </ul>
<b>Improve</b>	<ul style="list-style-type: none"> <li>Develop ideas to measure root causes</li> <li>Test solutions</li> <li>Measure results</li> </ul>	<ul style="list-style-type: none"> <li>Design new process</li> <li>Implement new process, structures, and systems</li> </ul>
<b>Control</b>	<ul style="list-style-type: none"> <li>Establish measures to maintain performance</li> <li>Correct problems as needed</li> </ul>	<ul style="list-style-type: none"> <li>Establish measures and reviews to maintain performance</li> <li>Correct problems as needed</li> </ul>

(Lovelock, Wirtz, & Singh Bansal, 2008)

### 3.0 Implementation

The success of Toyota comes from its culture; Toyota is one of those companies who think for the long term, continuously solving the origin of the problem, improve its employees and have a process of solving the problem. Toyota Production System (TPS) was created to make profits by achieving employee empowerment, customer loyalty and a very strong chain with suppliers. We are going to describe more about the Toyota Production System (TPS) and its effects on empowering Toyota's employees using very successful human resource management, continuous improvement, and innovation (Carreira, 2005).

#### 3.1. Toyota Production Systems (TPS)

TPS or Toyota Production System is designed to get rid of waste (muda), inconsistency (mura), and overburden (muri). The process of production should be flexible without stress "muri" and creates less "muda" and achieves the goals easily without obstacles.

The Toyota Production System is based on two concepts, Just-in-Time (JIT) and Jidoka. Before talk about JIT, first need to explain Kaizen philosophy. The Kaizen philosophy is drawn from the Japanese word kai, which means "continuous" and zen meaning "improvement" or "wisdom". The Kaizen management philosophy therefore, is defined as making "continuous improvement"—slow and incremental but constant (Kaizen, 2000). Toyota used Just-in-Time system to reduce waste and improve overall customer value. JIT is a way of working and means producing the necessary items in necessary quantities at the necessary time. Toyota achieved very low storage of inventories by reducing the waste, which in turn reduced the cost of production and simplified the production process. Waste has been identified as anything that does not create added value in the process of the production. Toyota has identified seven kinds of waste which are: 1) over-production, producing earlier or more than is needed this generates other waste such as overstaffing, storage, and transportation costs because of excess inventory, 2) motion, any motion employees have to perform during the course of their work other than adding value to the part, such as reaching for, looking for, or stacking parts, tools, etc., walking is also a waste, 3) waiting, (workers being idle and waiting other workers to pass them the items is considered waste), 4) conveyance, 5- processing

(waste of spending more time in a process than necessary), 6) inventory such as physical inventory or a queue of information, excess raw material, work in progress (WIP), or finished goods causing longer lead times, obsolescence, damaged goods, transportation and storage costs, and delay. Also, extra inventory hides problems such as production imbalances, late deliveries from suppliers, defects, equipment downtime, and long setup times, and 7) Correction, production of defective parts or correction. Repairing or rework, scrap, replacement production, and inspection means wasteful handling, time, and effort. JIT also reduces the total time spent on production activity and non-business work in addition to problem clarification.

Suppliers play a crucial role in implementing the JIT system in Toyota. Toyota has very strong relationships with their suppliers, which gave Toyota many benefits in relation to building valuable production chains through understanding their work, providing them with solutions for technical problems, providing them with the intensive, selective information, and conducting joint improvement activities – exchange best practices and trigger kaizen initiatives at the supplier's site (Liker, 2004).

### **3.2. Jidoka (automation with a human touch)**

Jidoka means building in quality as you produce the material, being “mistake proofing.” It also refers to designing operations and equipment so your workers are not tied to machines, and are free to perform value-added work (Liker, 2003). In other words, never letting a defect pass into the next station and freeing people from machines— automation with a human touches (Liker, 2003). So workers must solve the problems immediately to resume production. Jidoka is a culture that says stop to fix problems to deliver the quality right the first time. As an example of implementing Jidoka in Toyota, risk of shutting down production in order to surface problems and challenge team members to solve them is done. Inventory hides problems and reduces the urgency to solve them. The Toyota Way is to stop and address each problem as it is exposed (Liker, 2003).

### **3.3. Employee Empowerment**

The quality is employee oriented more than product oriented; Toyota's managers give every employee in the company opportunity to implement their ideas and suggestions in the work which leads to employee loyalty and job satisfaction, this empowerment includes suitable training to the employees and working in teams to achieve the assigned mission. This team is headed by a leader and managers are going to change the system accordingly if a change may contribute in achieving the company's seven goals which are saving time and cost of the job, making the job easier, safer and more productive, improve the quality, remove drudgery and nuisances.

### **3.4. The Relation with Suppliers**

Toyota bases their relation with suppliers on long-term relation, good price, study demand, and minimal paper work, for example using emails and electronic means. On other hand, the suppliers have an obligation towards the company, like deliver zero-defect components, on time delivery, and be a part to its customer's business.

## **4. Reasons for Development (Toyota Initiative to face Global Challenges)**

Prior to their success in the automotive industry Toyota Motors faced many daunting challenges imposed by government ruling after World War II, the economic state, and general lack of instability in fledgling industries. During this time products that were originating from Japan were considered synonymous with poor quality. However, governmental agencies pushed forth programs to increase countrywide competences by supporting cottage industries that would eventually blossom into something of considerable size. Increasing quality and production sizes became one of the primary goals for the country and unquestionably for Toyota Motors.

### **4.1. Increase Quality**

Although, research on improving quality can be traced back to turn of the century, Japan's domination – more formally Toyota's, began after World War II when the need for trucks by the American military was in great demand to aid in rebuilding the country. However, with the ongoing economic state waning due to inflation and worthless currency pervading the market, “cash flow became so horrendous that at one point in 1948 Toyota's debt was eight times its total capital value” (Liker, 2003). After observing American carmaker Ford Motor Co. and their famous production line in 1930 Eiji Toyoda, one the founding family members, along with several managers placed an intimidating challenge on Taiichi Ohno to develop a system that would emulate that of the Ford mass production process. The system had to be customized for the Japanese market and produce cars that met the small demand. In 1950 when Eiji Toyoda along with his cohorts again returned for a 12-week tour of American facilities they realized that many processes within these facilities created unneeded movement with inherent defects within production. Noting this aspect, Toyoda found an opportunity to make this existing system better, more stream-lined, which would inevitably lead to the rise of Toyota.

Seeing that the production lines at Ford Motor Co. were highly inefficient Toyota set out to “streamline” their production based on the continuous flow created by Ford’s production line, and make sure that these resulting processes with their accompanying philosophies were upheld to the highest degree. As stated in (Liker, 2003)’s book *Toyota Way*:

*“Toyota did not have the luxury of creating waste, it lacked warehouse and factory space and money, and it didn’t produce large volumes of just one type of vehicle. But it determined it could use Ford’s original idea of continuous material flow (as illustrated by the assembly line) to develop a system of one-piece flow that flexibly changed according to customer demand and was efficient at the same time.”*

So the rise of the Toyota Production System (TPS), to fully answer and the American problems that arose from their respective mass production practices. After years of observing their own processes, executing planned actions, and then observing again, TPS has become a formidable process that enables Toyota to be successful.

#### **4.2. Increase Customer Centric Activities**

Toyota not only wanted to focus on quality improvement by adhering to their production methods, but the organization also saw that the customer was a priority; which is another primary reason for the development of TPS. Customer needs from end user to supplier management were all deemed by Toyota as important links within the chain. The teachings of W. Edwards Deming through seminars across Japan had prominent influence in the TPS ideology and were deeply interwoven in the principles. Deming’s philosophies are arguably one of the reasons why TPS became such a marveled process that would be emulated the world over. “Each person or step in a production line or business process was to be treated as a ‘customer’ and to be supplied with exactly what was needed, at the exact time needed” (Liker, 2003). Learning this aspect Toyota followed Deming’s ideas where customers are considered the main driving force for business, and therefore is met with competence that foregoes all expectations by all persons within the company. This indefinitely initiated a phenomenon heralded in the business world.

*“When Ohno and his team emerged from the shop floor with a new manufacturing system, it wasn’t just for one company in a particular market and culture. What they had created was a new paradigm in manufacturing or service delivery— a new way of seeing, understanding, and interpreting what is happening in a production process, that could propel them beyond the mass production system”*

*(Liker, 2003).*

#### **4.3. Answer to a Faltering Economy**

In 1973 the oil-crisis was in full swing and many companies were hit by the faltering economy. The global recession had engulfed many countries, as well as, Japan who was the hardest hit. Industries within the country saw a drastic decline forcing many to pack their bags and leave the market. Toyota too was not immune to such an instance; however, although they were seen to display the same negative effects, the implemented processes and philosophies of TPS allowed them to recuperate and make a profit faster than their counter parts (Liker, 2003).

From these instances, Toyota learned that their TPS system was a powerful business tool that enabled them to overcome many odds. The organization also enabled them to tweak aspects that did not perform properly. However, the 1990s again saw the challenge of TPS when many manufacturers lost a strong foothold in the market. This decade saw the downsizing of many firms, lay-offs of employees, inventory reduction, and the usage of practices that were deemed the best just to survive. Japan as a whole including Toyota saw:

1. late restructuring
2. late off-shore outsourcing
3. late learning and implementation in production
4. late deliveries from supplier
5. with the general stockpiling of inventories

The latter was indicative of the digression of JIT/lean philosophies once valued from manufacturing. Nevertheless, Toyota was able to adapt to the situation, change their current processes to answer the volatile economy, and come out on top once more. Their ability to carry out various production runs at the same time on the same production line due to their standardization efforts allowed them to be flexible, and mold their output to the demands of the market. This ability to develop, to be flexible, and pattern their business model to any economic situation that transpires is the reason why the Toyota Production System is so successful. The derivative of this system

today, though still evolving, is powerful enough to answer many challenges, is one of the reasons why TPS has evolved to such a high complex state, and is the rationality behind for their current market dominance (Schonberger, 2007).

## 5. Outcome-Continuous Improvement

### 5.1. Toyota Production System (TPS), A Lean Way

By continuously monitoring the processes and developing them as needed, Toyota and its TPS are in a constant state of flux. Observances carried out by employees allow Toyota to improve and evolve their systems into *leaner* more efficient ones. Buttressed by a corporate-wide culture, having all employees identify where errors occur allow this corporation to grow progressively.

One of the main facets that TPS instills in the production of Toyota's cars is that efficiency is the overruling factor that dictates how processes should be done. Through the use of the adopted practices within TPS and the efficient environments that it creates, Toyota Motors has created a system that is tried and true to the goals it sets for itself. (Teresko 2006) states in his article, "Toyota's per-vehicle time: 27.9 hours compared with Ford and Chrysler at 37 and 35.9 hour respectively" was a decrease of 5.5% from 2003 to 2004. Comparatively, this is 2.2% higher relative to its competitors, which is an indicator that the current status of TPS is properly managing the production runs and achieving its primary objectives.

### 5.2. KAIZEN

Inherently the costs associated with all of its production runs compared to its competitors and even by its own standards are reduced. Waste or "muda" stemming from the Kaizen ideology is eliminated, thereby removing any additional overhead that may be incurred. Every aspect of the production run is calculated, managed, and executed with precision that in a holistic sense makes a system that is truly efficient. Suppliers are kept close, according to (Dyer 1994) at an average of 140km, which essentially reduces time of deliveries, inherently equating to lower cost. The fact remains "that as the distance between suppliers' and automakers' plants decreases, automakers' inventories as percentage of sales also decrease" (Dyer 1994). Furthermore, "trimming the excess fat" during its production processes make for a well balance system that can readily be modified to fit certain production variants. This allows for faster change over times required to produce different models, and in the long run again reduce the costs associated with them.

According to Masaaki Imai, the author of "The Key to Japan's Competitive Success", it is the Kaizen that leads to the success of Toyota. The successful implementation of Kaizen has helped Toyota to eliminate the producing time and waste of materials, improve the operation process and the quality level of products, as well as inspire the employees. (Imai 1986)

### 5.3 - Just-in-Time (JIT)

*Just-in-Time (JIT) delivers the right items at the right time in the right amounts. The power of JIT is that it allows you to be responsive to the day-by-day shifts in customer demand, which was exactly what Toyota needed all along.*

*(Liker J., 2004).*

Toyota Motors have increased their interaction with subordinates, as well as, suppliers knowing that one of the key elements to properly practice JIT is communiqué. Upper management within all divisions thoroughly communicates their ideas to subordinates, which is supported by (Teresko 2006) who states "Toyota recognizes that fulfilling the enterprise potential of TPS requires a substantial cultural shift toward collaboration and continuous improvement, both internally and externally.

This factor is further developed by the inclusion of suppliers into their system. Suppliers are implemented into the supply chain so that new parts can be delivered on time, every time, and in the right amount. In this open relationship, networking between Toyota Motors and its providers are completely interwoven where suppliers know the exact levels of supplies at a certain point in time, and will deliver more stock when levels dip below a set threshold. Indeed this reduces waiting time for delivery and creates a continuous flow of work that is uninterrupted substantiating the established goal of sales to the market and veritably increasing their profit margin. Toyota Motors favors this perspective so much that when they opened their new \$800M production facility in Texas it included 21 facilities in the surrounding park where important suppliers are located and time of delivery can be kept at a minimum (Teresko 2006).

Furthermore, the exchange of ideas is again strengthened by implanting engineers from their suppliers among in-house automotive engineers in their design facilities and vice versa. Toyota Motors therefore creates a setting where the exchanging of ideas can easily flow between the two entities. Development of new models, in addition to, reprimanding problems that may arise can therefore also be proficiently solved. By increasing face-to-face contact, Toyota Motors has found that a humanistic effect occurs and issues can be rightfully dealt with since these problems are not depicted as automaton issues. Unequivocally, this increases the speed of cycle times in processes and improves quality in terms of services and end product (see Appendix, Figure 2). Research has found that "Toyota

engages in an average of 7,235 man-days of face-to-face contact per year with supplier,” which supports this idea. Further buttressing this fact “roughly 20% of the top managers (*yakuin*) at Toyota’s affiliated suppliers are former Toyota employees, and these individuals help supplier coordinate with Toyota” (Dyer 1994).

## 5.4 - Customer Satisfaction

*“The degree of customer satisfaction is the ultimate measurement of quality. It is always the customers who judge the quality of goods or services, and the quality of our end products is determined by the external customers.”<sup>1</sup>*

*(Bergman, B. & Klefsjö, B., 2008).*

In recent years, many companies rate customer satisfaction as their top priority with a carefully designed customer satisfaction framework. Toyota is not an exceptional one, either. Since the foundation, the company always put the customers in the first place. It also has a large ongoing customer survey system which can obtain the information about the buying processes and experiences of delivery, service and product quality of customers at the first hand. (Bergman & Klefsjö 2008) In addition, Toyota set Customer Relations Division to deal with the information about customers’ complaints and expectation directly collected through questionnaires, telephone calls and quality reports or other form documents from dealers, as well as, the information from third party, such as consulting companies or studying institutes.

Due to the continuous efforts on three groups of customer needs (basic, expected and excitement needs), Toyota has achieved quite a lot of rewards and customer satisfaction on some extent, as well as, gained powerful brand name with good reputation for quality efforts among the people in the world. According to Yonkers, New York-Toyota Prius Topped Consumer Reports of "Most Satisfying Vehicles" customer satisfaction survey, 94% of respondents said that they would definitely buy one again. Furthermore, according to the J.D. Power Asia Pacific 2008 Philippines Customer Satisfaction Index (CSI) Study<sup>SM</sup>, Toyota ranked the highest in customer satisfaction with authorized dealer after-sales service in the Philippines with an overall score of 843, while the score of Ford was 841. (Source: J.D. Power Asia Pacific 2008 Philippines Customer Satisfaction Index (CSI) Study<sup>SM</sup>).

## 6. Discussion

### 6.1. What Toyota Used?

Using Kaizen in Toyota made a huge difference in relation to cost management; its effects are very significant in increasing production efficiency and add harmonization to the work. By implementing Kaizen in Toyota, Toyota could reduce the working hours by eliminating waste of time. In addition, kaizen encouraged good human relations on which TPS is based. JIT is powerful because it drives out unnecessary cost and helps detect problems that cause waste. Jidoka is the response to problems.

JIT is relatively easy to implement, but without the mechanisms of jidoka in place to support it, JIT quickly erodes, and the waste finds its way back in. When JIT and jidoka work together, they form the engine of kaizen that drives your system to get better every day.

### 6.2. Reasons

The successive trials of TPS through the years saw the evolution of a process that is regarded as world-class and a top business model to behold. Many corporations try to emulate this process, but fail to fully attain the essence of TPS due to not fully grasping the concepts and ideologies proposed by the system. TPS is an answer to the question of how Japan can rise above the chaos of war and overcome an economy in turmoil. TPS became a force to be reckoned with during the latter part of the century since it has stood ground against trying times and has increased its effectiveness through learning collectively from these experiences.

It is obvious to the outside observer that the main reason why the Toyota Production System was developed was to increase the efficacy of existing productions processes within the Japanese market. With influence drawing from American business models and teachings as the basis for the planned strategy, TPS has compellingly achieved this as can be seen by present day’s company status. The Toyoda family set out to create a car brand that was comparable to American brands, with the intent to efficiently produce according to the Japanese market, and they have. While doing this they seized an opportunity identified from observing their counterparts abroad. Mistakes and flaws were improved under the new philosophies derived and reinforce by strict abidance by each member of the organization.



Not only was quality an issue that was seen to need improvement, but the customer aspect is also a great part of the reason for such a remarkable change. Through the teachings of Deming, who even today is considered one of the gurus of quality and productivity, Toyota had harnessed an aspect that was not seen before within the industry. Deming had taught that a customer-centric dogma, which previously did not encompass any aspect of the production except for the end user, was crucial to the success of any system. By treating every person involved as a customer, proper results could be attained reducing the slack experienced during mechanistic transactions that most organizations migrate towards when processes become familiar and managers become complacent. Following Deming's theories created a win-win situation both for Toyota and for its suppliers.

TPS was also a derived answer for the economic plight that was ensuing during its inception and progression through World War II, the 1970s, and later on in the 1990s. Not only did it unintentionally provide Toyota an instance to truly test the capabilities of the processes implemented, but allowed for gathering of knowledge used to make the system better. From the instability experienced during these times, TPS evolved into a more "leaner" system. The inherent aspect of monitoring and changing according to environment further places TPS in the higher echelons of business models. The system displays all the characteristics of a learning system, or rather a learning organization as a whole depict by (Morgan, 2006) in his book, *Images of Organization*. By ingeniously including this open ended learning capability into TPS, the architects that conjured the plan demonstrated another reason for TPS's successfulness – long-term sustainability.

### 6.3. Outcomes

Toyota considers the human asset a priority, and places a lot of quality efforts to assure that its employees are well trained and work in a pleasing environment, as well as enhance the customer satisfaction constantly. Due to the Toyota Production System (TPS), Kaizen and Just-in-Time, the company has managed to create a continuous flow in its production line. From raw materials to finished product, every niche has been analyzed, monitored, and developed to assure the corporation that a continuous flow of production takes place. In addition, its suppliers are kept close to main production facilities to reduce time of delivery, readily know what these facilities need in terms of parts, and when they are needed.

Nevertheless, as the new system or quality tool has been introduced, there would definitely come up with some changes and problems to the company, furthermore, a successful innovation could not keep the company profitable permanently. In addition, the powerful competitors and changes on customers' preferences or tastes should also be taken into account. Therefore, due to these facets, Toyota should summarize its successful experiences, learn from the mistakes during the past years' efforts, and obtain the sustainable competitive advantage from the customer perspective with continuous innovation on quality as well in order to present a better performance for the future development.

### 7.0 Conclusion

Toyota Motor Company is a world-class company that represents quality through their products and efficiency through their production. The organization has mastered the art of designing and mass-producing vehicles for the global market. Toyota's achievements in philosophy, management, including the processes involved, have been emulated by organizations around the world that seek a competitive edge within their industries. Through their tried and true methodology, Toyota Motor Company has achieved dominance within the automotive industry, and is now considered the world's largest automaker. Their present status grew from a humble beginning in the 1930s, and has evolved into what it today through research, perseverance, and rigorous abidance of philosophies is learned.

The Toyota Production System (TPS) has grown from several methods used in management, which have been analyzed and scrutinized through research and execution. Comprised of various constituents of kaizen, JIT, 5S, Lean Production, and Six Sigma with the inclusion of an open-ended format for learning, this management system has been tested in real world situations and has repeatedly overcome any obstacles. It is a system that is constantly evolving to meet current demands of the market, assuring Toyota Motor Company that their customers from suppliers to end users will always be content of the service and products they receive.

Fujio Cho, the President of Toyota Motor Corporation questioningly stated in (Liker J. , 2003)'s book:

*"We place the highest value on actual implementation and taking action. There are many things one doesn't understand and therefore, we ask them why don't you just go ahead and take action; try to do something? You realize how little you know and you face your own failures and you simply can correct those failures and redo it again and at the second trial you realize another mistake or another thing you didn't like so you can redo it once again. So by constant improvement, or, should I say, the improvement based upon action, one can rise to the higher level of practice and knowledge."*

This statement inclines that the underlying values of Toyota Motor Corporation are based on trial and error, which have formidably allowed the organization to evolve and pattern itself for any demand it meets. It is the number one facet that has allowed Toyota Motor Corporation to rise above and overshadow its competitors. Furthermore, this concept has allowed Toyota to be more customer-centered creating close relationships that are long lasting and many times crucial to production. Not only is creating and keeping close relationships important to Toyota Motors, but keeping these relationships physically close allows for a more efficient affiliation. Likewise, allowing interspersions of employees within the rankings of its department from their affiliates and vice versa allows for a resourceful way of collaboration and exchanging of ideas.

However, is such a superlative methodology whose almost every aspect has been scrutinized for perfection fallible? Is there a situation that is so complex and dire that even this system cannot handle the negative interjections it imposes on the market? Only time can tell if this process is capable of handling such an event, but with knowledge about the ingenuity of the system, it would be very hard.

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