Toyota Analysis

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Executive Summary

Toyota Motor Corporation (Toyota) has emerged as a market leader in producing automobiles around the world. Toyota operates manufacturing facilities in over 27 countries and sells vehicles in over 160 countries/regions. They have gained notoriety for their development of the Toyota Production System (TPS), which uses a lean manufacturing model. “Just-in-Time management” has ensured Toyota stays lean in its production by not having excess inventory on hand as well as limiting idle time throughout their processes. TPS is a management technique of intelligent continuous improvement that has served them well.

TPS is a sought after methodology, but has proven difficult to implement by other auto manufacturers like GM and Ford. TPS requires strict discipline and winning the minds of the employees to ensure trust and the success of the program as well as training to ensure employees understand how the system works. Ringo Sho and Nemawashi ensure employees buy-in as well as taking their ideas into account is essential to the TPS process.

Using Ringo Sho and Nemawashi, Toyota Motor Corporation Canada (TMMC) had sought to obtain the right to produce the Lexus RX 330 line. They were successful in obtaining approval from Toyota management to produce the RX line because the TMMC Director of Operations Greig Arnold was astute in being the first person to raise the idea with Toyota management and because he took the appropriate steps in the Ringo Sho process. Further qualitative grid analysis shows TMMC would be able to produce the most vehicles efficiently
compared to other North American locations. Based on analysis, TMMC would be able to produce 112 units per person. Additionally, TMMC had more capacity remaining at their location compared to other alternative options as their production was projected to be down by 13% in 2000.

Using decision trees and probability, analysis reveals the optimum production of the Lexus RX would be 25,000 units in ideal market conditions to maximize profits. In 2010, however due to the down economic conditions and other factors within Toyota, sales have been down by 39% over the last three years. Customer confidence in Toyota has declined with the multiple safety recalls. This is a contributing factor to the drop in sales.

At present, Toyota needs to improve their quality control mechanisms in their North American operations. They have safety recalls on ten of their most popular vehicles. These vehicles include: Avalon, Camry, Corolla, Highlander, Matrix, Prius, Sequoia, Tacoma, Tundra, and Venza. This is a clear sign of a breakdown of their quality control mechanism known as “andon”. Andon, however has recently been started as they have stopped production of all affected vehicles until appropriate solutions could be implemented. This is an example of how the TPS works, but also shows there can be a time critical delay in finding some problems that occur.

Another TPS critical pitfall is the lack of additional inventory to sustain operations for even a short period, should a vendor fail to produce a part that is needed. While not keeping extra inventory on hand is part of the lean manufacturing program dictated by TPS, this can and has lead to work stoppages while the flow of parts had ceased from vendors.

TPS is a good operations management tool, but it is not perfect. All operations management tools/techniques can use tweaking from time-to-time. Good operations management tools have self-correcting abilities as seen within TPS; however, we recommend
they add enough inventories of parts to last them at a minimum of a week or two to sustain operations should there be a vendor failure. Further, we recommend increased quality control checks to ensure efficient operations as well as limiting liability because of critical safety issues.

Introduction

Established as a company in 1937 and launching its first automobile in 1947, Toyota today is the third largest automobile manufacturer in the world and the largest in Japan. Over the years, the company has methodically become a global icon, operating 54 manufacturing companies in 27 countries around the world. Furthermore, Toyota vehicles are sold in more than 160 countries and regions. In expanding its operations on such a wide global scale, the company has taken the stance of localizing its business in order to provide the right customers with the right products. This belief has helped foster long-term relationships with local suppliers and helped the company better serve local markets.

Another important tenet, which has aided Toyota in its success over the years, has been an emphasis on quality management. The use of the Toyota Processing System (TPS), Ringo Sho, and Nemawashi are all examples of systems that encourage an employee-influenced working environment. The principles of the TPS aim at producing zero-defect products by getting employees to think their way through issues, while Ringo Sho and Nemawashi allow employees to introduce initiatives and consult with stakeholders. Together these philosophies have helped build a highly employee-oriented environment.

In their quest to increase car sales in North America during the late 1980’s, Toyota built manufacturing plants for parts production and vehicle assembly for the market. This would eventually lead to the company entering into joint ventures with North American automobile
manufacturers. A major subsidiary of Toyota in Canada, Toyota Motor Manufacturing Canada (TMMC) is located in Cambridge, Ontario and is recognized today as a major production plant with high quality manufacturing. After the successful implementation of KPI-Cognos, a data collection, warehousing, and analysis tool of Key Performance Indicators, at TMMC, the production plant is being considered as the production site of the new line of Lexus RX 330. A careful recommendation is to be made to top management considering alternative U.S. plants, capacity, quality record, specialization, and process management. Making the case for the production of the new RX 330 will have to take into account more than just the obvious factors, but rather the entire scope of global operations strategy.

**Exercise 1**

The following are key terms found within TPS and their applications in other industries:

**Andon** – A visual display that provides real time notification of quality or process issues and/or problems. At Toyota, Andon is used to immediately signal which work area has a problem. This leads to a stop in production so as to identify and correct the issue.

**Genchi Genbutsy** – The idea of valuing practical experience over theoretical knowledge. Genchi Genbutsy is highly practiced in the civil service of the Department of Defense as veterans and former active-duty personnel are valued as civil servants once they retire. Preference is often given to these experienced workers when it comes to hiring as they posses years of practical knowledge from time served and bring a unique, problem solving perspective to the civilian workforce.

**Hoshin** – Strategic goals for the organization with measurable targets and ways for reaching them. Designed to result in increased production and performance and developed by management. Hoshin can be found at virtually every corporation, as strategic goals are set
by management each year to improve past performance. These include customer satisfaction, personnel training, diversification, and competency building. These could be set for over a period of multiple years or could vary from year to year, with hard targets set for measuring results.

**Jishuken** – Continuous process improvement activity driven by management in order to bring about process improvement in specific areas by facilitating events in the organization. At the Naval Sea Systems Command, management identified the need for continuous process improvement in aligning personnel with appropriate competency domains. This resulted in a three-month process of events, seminars, briefings, etc. to get the organization aligned in terms of competency.

**Muda** – That which adds no value or improvement, but rather viewed as waste. The seven types of muda (overproduction, waiting, conveyance, processing, inventory, motion, and correction) are all deterrents to an organization’s level of productivity. In the industry of ship construction, major shipbuilding contractors such as Northrop Grumman and Bath Iron face Muda in their production environment and constantly implement strategies to help minimize them. The scale and length of time in production in this industry exposes corporations to higher prevalence of muda as they deal with billions of dollars worth of work.

**Nemawashi** – the consultation of other departments for input, ideas, and information on a change that affects them. This is practiced at lateral organizations where the sharing of ideas is highly encouraged and information flows laterally instead of top-down. In an organization, this would ensure that employees’ input are considered and also that those affected by a change would have input.
**Yokoten** – this means knowledge is shared across everywhere. Plant related activities are communicated plant wide as well as with company affiliates. This ensures that the rest of the entire organization is in tune and on par with the best performers of the organization. At Naval Sea Systems Commands, high level departmental head meetings often take place where the departments with high achievements share its knowledge, lessons, and, processes with the other departments. This is done to share knowledge across the entire organization and ensures high performance across the board.

**Kaizen** – Continuous improvement system taken on by all employees and at a minimal cost. Most corporations today have implemented continuous process in the form on lean events. However, Kaizen is performed by all employees rather than specialists. At Toyota, employees are urged to “think” through their work and find solutions by “using their head”. This encourages continuous process improvement as such an environment leads to wisdom.

Toyota Production System (TPS) is a quality management system employed by Toyota to make more effective and efficient the process of automobile manufacturing. Based on the principles of Jidoka (just in time management) and kaizen (continuous improvement), TPS is designed to reduce inventory carried by Toyota and its suppliers, while empowering employees to take initiatives in affecting change.

TPS allows employees to think in a “pull” system by allowing workers to come up with solutions and make decisions. This ultimately results in the development of the employees and fosters an environment of continuous improvement. In addition, the implementation of Ringo Sho and Nemawashi allows further employee involvement in the form of initiative-taking and reaching consensus.
TPS relies heavily on the utilization of such tools as kanban cards, andon boards, and poka yoke. While all these are great tools to be used by workers in implementing a pull system, they are just tools. Successful implementation of TPS requires more than just these tools functioning. It requires the successful interface by Toyota workers to operate these tools, getting the right information, and putting the information to use.

TPS today is recognized as the most efficient production system in the world. It has been written about many times and it is responsible for the huge success that Toyota has earned in the North American market. The company continues to perfect the system and make it better as it is continuously improving processes and implementing new ideas. Iconic American automakers Ford and GM have tried to implement lean production systems such as the TPS but to no avail. In the past, the American corporations have relied on assembly lines and mass productions, total contrasts to Toyota’s TPS system, and this made it difficult for them to implement lean production changes due to the “mass production” mindset. As a result, Toyota has continued to dominate the automobile markets in North America, while the domestic companies continue to struggle.

**Exercise 2**

Toyota’s Lexus brand is another popular line of luxury vehicles, which has been doing well in the North American market. To further Toyota’s expansion of vehicles in North America, Toyota had decided to produce their Lexus RX series in TMMC. Toyota’s decision to select a plant location for its Lexus RX330 model required them to evaluate all the options, and optimize their decision based on numerous criteria that are held as high priorities, and company standards. According to the Johnson’s (n.d.) article “Toyota Motor Manufacturing Canada (TMMC): The Lexus Rx 330 Line”, Toyota values growth, market share, employee satisfaction,
quality control, efficiency as key values to their decision making (p. 1). Above all of the factors that are measurable, they believe in a process that has worked for them for past years called Ringo Sho and Nemawashi that is basically a stamp of approvals from all levels, and agreement or overall consensus that the objective being sought should move forward. TMMC’s Director of Operations Greig Arnold was studious enough to know the process, and successfully raised the opportunity for obtaining the privilege of producing the Lexus RX series at his plant.

Part of Operations Management is to use tools to help management make tough decisions. When one decision is just as good as the next decision, a grid analysis can be used to find the optimal results especially when the data that is being evaluated is qualitative in nature. In the chart below, the qualitative data was assigned a numeric value that depicts the overall satisfaction of one solution over another. Where does one plant excel where another one struggles. When the qualitative factors have been recorded, management can then determine which are the highest priorities or factors to them. If all the factors are equal, then they can all be summed up, but when several factors are greater or lesser in value, weights are used to determine its true importance in the whole scope of the evaluation.

The factors listed have been determined as important to Toyota in deciding which plant will produce the Lexus RX330:

- Production Volume
- Ringo Sho & Nemawashi
- Capacity
- Exports
- Plant Size
- Investment
- Employment
- Operations
- V6 plant
- TPS / Network Optimization
- Growth
- Quality
- Genchi-Genbutso
- Costs / Profit
The most important future goal for Toyota is growth, which is the ability to expand market share, product lines and facility size. Ringo Sho & Nemawashi, capacity, TPS / Network Optimization, Quality, Profit, Costs are equal components that value 10 percent of the decision. Exports, investment, employment, and operations round out the next factors followed by Plant Size, Production Volume and finally V6 Plant.

| Factors     | Production Volume | Ringo Sho & Nemawashi | Capacity | Exports | Plant Size | Investment | Employme nt | Operations | V6 Plant | Network Optimization | Growth | Quality |
|-------------|-------------------|-----------------------|----------|---------|------------|------------|-------------|------------|----------|----------|----------------------|--------|---------|
| Weights     | 0.02              | 0.1                   | 0.1      | 0.05    | 0.02       | 0.05       | 0.05        | 0.05       | 0.01     | 0.1      | 0.15                 | 0.1    | 0.1     |
| TMMC        | 2                 | 1                     | 3        | 2       | 2          | 2          | 2           | 2          | 0        | 4        | 3                    | 4      | 4       |
| TMMK        | 0                 | 0                     | 4        | 0       | 5          | 4          | 4           | 4          | 1        | 2        | 2                    | 4      | 3       |
| IMMI        | 3                 | 0                     | 1        | 1       | 3          | 2          | 1           | 1          | 0        | 3        | 1                    | 1      | 1       |
| NUMMI       | 1                 | 0                     | 2        | 0       | 4          | 3          | 3           | 1          | 0        | 2        | 1                    | 3      | 2       |

When determining growth, we are looking how to become more efficient to use the least amount of resources and reduce the amount of un-useable materials. According to Johnson’s (n.d.) article, TMMC was named the most efficient assembly plant in North America by JD Power and Associates. This can result in a direct increase in units produced while decreasing waste. TMMC ranks the highest in the grid analysis because of the strides it has taken to become more efficient. Other considerations determining the growth model were: effectiveness of operations, resource utilization and allocation, and which plants were more independent than others.

TMMK has more capacity, better network optimization and ranked high on the charts winning 8 awards in 10 years for Plant Quality. While TMMK is a much bigger factory that produces more models, TMMC matches its quality with 7 awards in 9 years. Capacity is not as
high, but with projected totals of production volume down 13 percent for the year 2000 for total vehicles, the ability to introduce a new line is feasible. TMMC has been the only documented Toyota plant to go through the correct business approach to secure the new Lexus model in its plant. This initiative and approach appeals to leadership because it has allowed every midlevel manager to view the detailed approach and allow them to stand behind it by ringo sho. This also shows the process in place is working and kaizen or continuous improvement has been sought out. Unless another plant has also gone through the same steps as Greig, the perception to the president of Toyota is there is unanimous consensus from employees and expectations would believe the Lexus RX 330 line would belong to TMMC unless senior leadership pointed out another option.

Costs and Profit play as much a role as does formalities, because the bottom line of profitability, increasing market value, rewarding share investors all points to more investment and growth within the company. Cost and Profitability from the charts listed below, TMMI has the lowest average salary and the lowest investment cost, followed by TMMC, NUMMI, and finally TMMK. While the average salary correlates to costs saved, so is the productivity of past results. In the table below, we see that TMMC produces more than twice the amount of materials than TMMI and NUMMI. TMMK did not have available data to calculate its past production. It is important to note that on April 2000 the exchange rate between the USD and Canadian dollar was 1 USD = 1.469900 Canadian Dollar (X-Rates). This correlates to cheaper costs of labor or the ability to buy more materials in Canada.

<table>
<thead>
<tr>
<th></th>
<th>Investment</th>
<th>Payroll</th>
<th>Employment</th>
<th>Production</th>
<th>Average Salary</th>
<th>Unit per person</th>
</tr>
</thead>
<tbody>
<tr>
<td>TMCC</td>
<td>$ 1,960,610,971</td>
<td>$ 199,976,425</td>
<td>3200</td>
<td>358,991</td>
<td>$ 62,493</td>
<td>112</td>
</tr>
<tr>
<td>TMMK</td>
<td>$ 5,300,000,000</td>
<td>$ 484,700,000</td>
<td>7490</td>
<td>$ 64,713</td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>TMMI</td>
<td>$ 1,600,000,000</td>
<td>$ 145,500,000</td>
<td>2617</td>
<td>129,724</td>
<td>$ 55,598</td>
<td>50</td>
</tr>
<tr>
<td>NUMMI</td>
<td>$ 2,200,000,000</td>
<td>$ 351,900,000</td>
<td>5506</td>
<td>294,080</td>
<td>$ 63,912</td>
<td>53</td>
</tr>
</tbody>
</table>

Other factors that contributed to the overall decision based on the grid analysis focused on marketability, Genchi-Genbutso or actual testing in the markets you are attaining (The luxury
sports car that could handle smoothly on slippery or unpaved roads). Exports to surrounding countries increase visibility and decreases costs for shipment since it would be closer than other plants exporting. How well could Toyota transition other flows of production to other plants? With a new model targeted for production at TMMK in three years, would it be prudent to start a new line there?

After all the factors had been documented and scored, then multiplied by the weights formulated to be in Toyota’s best interest, it was concluded that TMMC had the highest overall score and therefore would be the best plant to produce the Lexus RX330 line. While some areas were weaker than other plants, it is willingness to be efficient and effective will continue to strengthen Toyota and keep growth at an optimal pace.

**Exercise 3**

Useful operation management tools allow individuals to clearly see results of their decisions. Such tools will give them the insight to ask the questions “what if” and “how”. Decision trees are one of the tools that can optimize solutions by allowing a person to depict a chart that starts with the options available to them. In the TMMC Lexus case, there are five available options to choose from. The decision is to choose from ten thousand, fifteen thousand, twenty thousand, twenty five thousand, and thirty thousand units to produce annually and maximize the potential profit. Each decision then braches out into three separate lines to find the
expected demand and the probabilities, broken out as Low, Moderate, and High.

At this point in the decision tree, the profit has been deduced by taking the average sale per car and subtracting the costs per car (37,000 – 28,000). The profit per car is $9,000. Next, we see how many units can be produced based on the raw data that was supplied in the chart for 2003 – 2007. The first scenario of 10,000 units can produce 10,000 units each year for a total of 50,000 units. Next, we take the profit and multiply by the units to find out the total value of $450,000,000. This will also be the value for moderate and high because the max amount of 10,000 is reached in each demand scenario each year. Finally we take the costs associated with creating the capacity and subtract it from each line to find that maximum amount of profit expected.

Example:
It cost $50 Million to build the initial capacity of 10,000 units. For five years maintenance it will cost an additional $50 million ($5 M per 5,000 Units per year). When subtracting the cost of $100 million from the maximum profit of $450 Million we are left with a maximum amount of $350 Million. If no cars were purchase during that five-year span, then we know the minimum would be $0 profit. The person using the decision tree will apply the same method for each line of the node, and for each node in the tree. Once the results have been gathered, management would multiply the maximum amount by the percentage that was listed to the left of it. In our example above for the ten thousand units, we would multiply the max of line 1 ($350 Million) by 0.25 percent for Low, max of line 2 ($350 Million) by 0.5 percent for Moderate, and the max of line 3 ($350 Million) by 0.25 percent. The sum of all the leaves, that is Low, Moderate, High will give the demand for each node or decision. The usefulness of the decision tree is utilized by maximizing demand that leads to maximizing profit, and evaluating decisions that are more complex and need analysis. In the case of TMMC, to maximize profit, 25,000 units should be selected.
Limitations that arise when using decision trees occur from qualitative data that cannot be analyzed with computations, dependencies on reliable data that is supplied, and only focuses on numbers and not situations. For TMMC, there is an assumption that a luxury vehicle will be popular among citizens of North America. If probabilities are dynamic and fluctuate daily, then the decision tree should be used as part of the decision process not solely as the correct answer. The current state of Toyota has shown that defects and external controls can change the opinion
of quality in a company, and make decision trees uninformative. Historical trends do not translate into present day profit when public opinion can sway so quickly.

When Toyota first opened its Lexus RX line at TMMC, they enjoyed increasing sales, a very successful campaign, and captured a huge market share with their new line. In 2010, not only has a recession had its toll on the Big Three automakers of America, but also the Lexus line for North America has fallen 39% in the last year. While the economy has had its turn for the worse, a top executive from Toyota, who was brought back to revive the brand in North America, believes there is more behind the numbers. Decisions have been made by employees that would normally be handed down from the president of Toyota and the business culture must get back to it was they were successful (Kiley, 2009, p.1). Sales have shown a decrease in the last three years and with safety issues now at the forefront of consumers’ minds, Toyota will need to work harder at earning the trust of the consumer. The last three years have shown the following sales figures:

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>103,340</td>
</tr>
<tr>
<td>2008</td>
<td>84,181</td>
</tr>
<tr>
<td>2009</td>
<td>93,379</td>
</tr>
</tbody>
</table>

Executives at Toyota believe that standards and quality in Japan rivals that of its subsidiary North American plants, and has taken steps to revive its brand name. Yoshi Inaba, the new president of the North American plant plans to return the company to its roots by focusing less on trucks and more on style and cars that “people will fall in love with” (Jackson, 2009, p. 1).
Toyota produces vehicles throughout the world to include North America. They operate 14 parts and manufacturing plants across Canada, United States of America (USA), and Mexico (Toyota Motor Corporation, 2010, p. 1). “In 14 manufacturing locations across North America, team members are producing 11 vehicles including the Avalon, Camry, Corolla, Matrix, RAV4, Sienna, Sequoia, Tacoma, Tundra, Venza and the Lexus RX 350” (Toyota Motor Corporation, 2010, p. 1). Toyota products in North America are distributed through their plants to dealerships. Toyota Motor Sales handles the allocation and distribution of the finished vehicles to dealerships across Canada, USA, and Mexico.


In the United States of America, there are currently nine active, soon to be eight, Toyota plants. Further, sometime in 2010, they plan to be back to nine active plants. TABC, Inc. “produces sheet metal components, steering columns, catalytic converters, coated catalytic substrates, and weld sub-assemblies for Toyota’s North American manufacturing facilities and for export to Japan” (Toyota Motor Corporation, 2010, p. 1). Toyota Motor Manufacturing, Kentucky, Inc. produces powertrain parts, 4-cylinder and V6 engines and the following vehicles: Avalon, Venza, Camry, and Camry Hybrid (Toyota Motor Corporation, 2010, p. 1). Bodine Aluminum, Inc. has three plants and they produce the following parts for Toyota North America:

Mexico has one Toyota manufacturing plant in Baja California, Mexico. This location is called the Toyota Motor Manufacturing de Baja California, Inc. S. de R.L. de C.V. The Mexico facility produces the Tacoma and Tacoma truck beds for New United Motor Manufacturing, Inc (Toyota Motor Corporation, Inc, 2010, p. 1).

The aforementioned manufacturing plants and part facilities are all part of Toyota’s North American operations. These facilities also use local parts manufacturers to obtain parts for the Toyota vehicles produced. The utilization of local manufacturers is in-line with the Toyota Production Systems way of operations. By utilizing locally produced goods, Toyota is able to limit the level of inventory on hand as well as reduce transportation charges; this falls under the philosophy of “just-in-time production”. Further, they are able to save money by keeping excess inventory at a minimum. The biggest pitfall we see with this method of operation is when a
supplier runs into difficulty producing a part, operations at any given facility can be reduced or shutdown. This is especially true, if the part is critical and Toyota does not have any other alternate suppliers who can provide them with the part in question. This predicament can also have a ripple effect on multiple operations in North America, shutting down operations at multiple plants, if a part is unattainable for any period. According to Chris Nielsen, vice-president for purchasing at Toyota North America, Toyota’s suppliers are doing better now than a few years ago (Murphy, 2008, p. 35). While Toyota’s suppliers may have been doing better in 2008, it does not mean they will continue to do well now or in the future. We believe the best way to mitigate the risk of a vendor failure would be to obtain parts from multiple sources to build redundancy to help mitigate the stoppage of business should one vendor fail to be able to provide a part. Further, it would be wiser to have an excess of inventory to last at minimum of one to two weeks as a contingency. One example of an emergency situation was when Riken Corp. a piston ring manufacturer in Japan suffered casualties due to an earthquake and was not able to produce piston rings; Toyota and other Japanese automobile manufacturers suffered major losses in operations, which devastated Toyota’s production in 2007 (Chozick, 2007, p.1). This is one actual example of how “just-in-time production” failed for Toyota.

The Toyota production and distribution system as it stands is efficient in reducing transportation charges for delivering vehicles to North American customers. They save on shipping charges and import/export taxes/tariffs. Canada, USA, and Mexico are part of the North American Free Trade Agreement (NAFTA), and therefore capitalize on trading goods/services without large tariffs. Toyota, while producing its vehicles in North America enjoys the privileges of NAFTA, which helps to keep their prices low and profits higher. Per Yung (2003), Mexico’s market for Toyota and other vehicles have greatly increased because of NAFTA where Mexican’s now have access to more choices (p.1). We believe Toyota’s production and distribution system in North America is greatly benefitting from NAFTA.
Toyota’s philosophy of lean manufacturing to reduce waste and idle time dictates why they have chosen their current method of distribution to produce cars in North America. Producing cars in the market they wish to sell their products is the most efficient route to undertake. This route increases efficiency by reducing logistics and transportation costs. Toyota’s principle of being a good corporate citizen further mandates they use local suppliers. ToyotaSuppliers.com (n.d.) is the location potential suppliers can go to find out ways they can become a supplier for Toyota parts (p.1). Providing avenues to potential local vendors is along the lines of how Toyota is striving to be a good corporate citizen as well as reduce its costs in manufacturing. This method of obtaining parts and the distribution of vehicles in the local market further enables Toyota to keep to their lean “just-in-time production” theory intact by reducing inventory on hand. Further, this distribution of vehicles and parts ensures they keep to prescribed schedules, as they do not have to worry as much about parts getting to their locations from overseas on time. If they were to add another route or deviate from their current system, this would increase the burden on the system and cause other parts of their system to be delayed.

We believe the current method of distribution is optimal to reduce logistical costs; however, it appears they lack redundancy in their operations for obtaining parts. As noted previously, Toyota can enhance their operations by increasing their inventory to sustain operations should there be temporary difficulties in obtaining parts. Toyota currently has a policy of helping their vendors if they are unable to fulfill their commitments for producing parts by sending Toyota engineers to help the vendor (Toyota Suppliers.com, n.d., p. 1). This aspect of Toyota’s philosophy can cause delays in producing vehicles. While this is being a good corporate citizen, it can cause delays in production.

Another aspect for the reasons Toyota decided to produce cars in North America was to compete with U.S. domestic manufacturers. According to Johnson (n.d.), in the 1980’s Japan was a closed market for U.S. car manufacturers, so U.S. manufacturers complained and the U.S.
government imposed higher tariffs of imported vehicles, which forced Toyota to begin manufacturing vehicles in the U.S. in order to be able to compete in the U.S. (p. 2). We believe this is the key reason Toyota was forced to build manufacturing plants in the U.S. as well as to begin joint ventures with North American companies. If Toyota would not have moved some manufacturing operations into North America, then the prices of Toyota vehicles would have been much higher and would not sell as well amongst the average U.S. consumer. Further, Toyota may have chosen this route to help ease the transition and acceptance by Canadians, Americans, and Mexicans by operating production plants in North America to make consumers feel they are buying locally produced vehicles. Entering the North American market has served well for Toyota in its current operations and sales.

Further to producing vehicles in the U.S., the North America Free Trade Agreement (NAFTA) of 1994 enabled Toyota to build manufacturing facilities in Canada and Mexico and still be able to sell vehicles produced at any of these three countries amongst North American consumers without paying high import/export tariffs. NAFTA was an added incentive for Toyota to increase production and sales of vehicles in North American countries and benefit from not paying high tariffs. One aspect Toyota has been watching closely about NAFTA is the fact they have to produce the vehicles with 62.5% locally produced parts, which had prompted even more development of Toyota parts manufacturing in North America (The Japan Times, 2000, p.1).

Toyota is still expanding in North America. They have been building a new plant in Mississippi, which is expected to be operational in 2010. This plant is expected to produce 150,000 Prius hybrid vehicles per year (Mississippi Development Authority, 2008, p. 1). This is another area, where Toyota is expanding in North America to increase efficiency to meet the
demand of their customers. One aspect Toyota needs to be careful about when it is expanding is to ensure the quality of their vehicles. Per Toyota (2010), they have recalled the Prius because of breaking problems (p.1). Further, as of February 10, 2010, the following vehicles are also recalled for faulty gas pedals and other safety concerns: 2005-2010 Avalon, 2007-2010 Camry, 2009-2010 Corolla, 2008-2010 Highlander, 2009-2010 Matrix, 2004-2010 Prius, 2008-2010 Sequoia, 2005-2010 Tacoma, 2007-2010 Tundra, and 2009-2010 Venza (Toyota, 2010, p. 1).

The expansion of Toyota manufacturing in North America is to continue their growth and gain market share, however, they need to get back to their roots in quality to ensure they manufacture safe high quality vehicles. The current manner Toyota has chosen to produce cars in North America and expand manufacturing is indeed to efficiently grow their business.

**Conclusion**

ToyaMotor Corporation begun automobile production in 1943 and has gained notoriety due to the quality of their vehicles. TPS has enabled Toyota to increase/decrease vehicle production based on market demand. Toyota’s TPS methodology is a sought after operations management tool for lean production. TPS can be used in many different organizations, but employees need to be molded to the mindset of TPS for it to be successful. TPS also has its pitfalls for Toyota, especially as they do not keep any extra inventory on hand for situations when vendors fail to produce needed parts.

The Lexus RX line was awarded to TMMC due to their ability to show Ringo Sho & Nemawashi in their presentation. Further, TMMC had the required capacity and quality required to undertake the production of this luxury vehicle. Based on analysis, TMMC would need to produce 25,000 units to obtain the peak profits of the Lexus RX, but this is based on projected profit optimization and not necessarily on market demand. Due to the current market downturn and quality concerns with
Toyota products, Lexus vehicles have not been selling as well in the past three years. They are currently down 39% in sales.

Toyota further needs to conduct increased quality checks on their operations in North America and other parts of the world to ensure quality controls that are in place are working. Due to the recall of 10 of their most popular vehicles that were produced in North America, Toyota must now begin damage control and assure customers that Toyota still produces high quality vehicles.
References


http://polaris.umuc.edu/~jstewart/Amba604/TMMCCase_Final.pdf


