Toyota is truly an international company, producing over 5.5 million vehicles a year in 27 countries. Its Toyota Production System (TPS) is considered by many to be best in class and this has been proven with numerous awards for manufacturing quality. The company's twin philosophies of "just-in-time" production and Jidoka, which works to prevent defects, have made its success almost unparalleled and executives from all over the world have flocked to Toyota plants to learn the company's secrets (Spears & Bowen, 2006, p.2). Andon is one of the main elements of the Jidoka quality-control process used in TPS. It is the ability to monitor the current work process, therefore detecting problems and stopping manufacture when defects in production found. A Garage, a clothing company, should include this concept in the making of its products. It would allow the company to avert shipping damaged goods that are inventoried until they can be sent back to the factory. Hence, Andon would help achieve one of the company's objectives, reducing expenses, because it would lessen the amount of defective goods sent to the stores.

Hoshin is a year to year or multi-year process implemented by the executive management of Toyota to increase efficiency and effectiveness of the company by setting objectives, prioritizing them and finding ways to achieve them, consequently taking the organization to another level of achievement and performance. Just as every company, Garage has goals set for each of its branches. Part of those goals are attaining at least 4.0 units per transaction, $40 per average transaction, a 20% conversion, meaning out of all the customers that come into the store at least 20% of them must purchase 4 items that average out to $40, and last, but not least, a daily amount of revenue the store should attain. However, these goals need to be prioritized by their importance in order to take the organization to a new performance level. Thus implementing the Hoshin method would assist with this process.

Grid Analysis

As Toyota looks to determine where it should produce the Lexus RX350 in North America, it needs to weigh several competing factors. Furthermore, the company must be mindful that not all of these inputs are equally important; some are more relevant to the final decision than others. In this instance, one method that Toyota can employ in its decision making process is the use of a grid analysis, which is also known by several other names, such as a weighted scoring model or Pugh matrix. This is an assessment system that is part of Six Sigma methodology; in other words, it is a rational process that also provides a visual representation of the decision making process in graphical form. This tool is valuable when confronted with a situation in which the best option is not obvious and is particularly useful if several attractive alternatives exist. In this case, Toyota is trying to determine whether it should build its Lexus RX 330 at its Toyota Motor Manufacturing of Canada (TMMC) plant located in Cambridge, Ontario or have one of its U.S. manufacturing facilities build the car. In order to make an informed judgment, Toyota's management needs to identify factors that should be considered when choosing a location and determine which aspects are most significant in regards to site selection. As will be discussed shortly, each choice presents both potential benefits and shortcomings.

A grid matrix is basically an array in which possible alternatives are listed upon one axis; in this instance, those options are manufacturing the car at TMMC or in America. On the other axis is a list of selection criteria "weighted dependently of their respective importance in the final decision" (RFP, 2010, Para. 8). After designing the array, the process next entails the assignment of a value for each of the factors based on their relative importance to the overall decision. In this case, criteria will be given a number from 0 to 5, with zero being not significant and five being extremely vital. Numbers 1 through 4 will represent increasing importance. This step is the weighting of each criterion. The third step is to then assess each site location and give it a score relative to each factor. Again, each choice-factor variable will be given a score based on the same rating scale as was done for weighting factors, 0 through 5. After that is completed, you multiply each of the scores in step three by the weight of each factor determined in step two to give you a weighted score for each option-criteria combination. The final step is to total the weighted scores for each location and the plant that has the highest total should be the site selected to build the Lexus RX 330.

While a grid analysis helps break down more complex choices into manageable pieces and provides a visual representation of the decision process, there are some down sides. First, vital factors may be omitted from the analysis. Second, it is possible that the weights assigned to each criterion prove inaccurate, meaning that their importance in the overall decision is misrepresented. To account for these issues, it is imperative that Toyota fully

research each selection aspect to ensure that it accurately reflects all factors and their significance. Furthermore, it is possible to skew results when a particular outcome is desired; i.e., the grid analysis is used solely to justify a preferred answer. That said, the use of sensitivity or robustness analyses can work to prevent this by subjecting results to a more thorough, systematic review (RFP, 2010, Para 33). However, by soundly developing criteria, identifying viable options, carefully weighing each factor for importance and scoring via a ratio scale, known as the COWS method (RFP, 2010, Para. 8), Toyota can be confident its decision in regards to where to build the Lexus RX 330 is the right one.

Now, it is time to discuss each of the factors and discuss their importance to overall selection factors. Grid Analysis Factors There are key factors worth mentioning when considering where the new Lexus RX 330 line should be manufactured. These factors can be broken down in to two main types, outside environmental considerations, i.e., exogenous, and the internally controlled Toyota Corporation factors, i.e., endogenous. Climate is the first exogenous criterion. The natural climate in parts of Canada allows for an optimal environment to perform Toyota's cold weather research. Toyota could establish a significant cold weather research and development facility in the United States, but that would require additional resources and only Alaska or the northern continental U.S. would provide a similar environment. Therefore, TMMC would rank 4 and the U.S. 2 in this factor. Since cold weather research is not a major decision making factor, its weight would be a 2. TMMC is non-unionized plant which means Toyota would not be subjected to the pressures of the United Automobile, Aerospace and Agricultural Implement Workers of America ("Unions," 2007). This would help alleviate external pressures to pay higher wages, the possibility of strikes and deviation from its core corporate culture beliefs. Furthermore, Toyota's California operation is unionized and there are efforts to establish a union in its Kentucky plant (Freeman, 2007, para. 2). Because unionization, an external factor, could lead to increased costs in regards to wages and benefits, the factor scores a 3. TMMC is individually weighted a 5 and the U.S. a 3. Toyota believes in localizing operations because this allows Toyota the flexibility to produce the RX 330 in a region that allows for the close proximity to component suppliers and a larger customer base. Localization is an exogenous factor. Since this applies to both the U.S. and Canada, they both receive a 4. Since this is central to Toyota's corporate tenets, it receives a weighted factor score of 4. Toyota should choose a country where it will receive the most financial benefits and much of that hinges on exchange rates, another external factor. The lower value of the Canadian dollar versus the United States dollar would allow Toyota to get more for its money for Canadian production, though, with the weakening dollar in the world economy, this may not hold true in the future. Hence, while this is a moving target, at this point the U.S would rank 3 and TMMC 2 because of the Canadian dollar's strength in relation to its U.S. counterpart. Since exchange rates can play a large part in an international company's profitability, this factor weighs a 4. Canada has a strong history of local support for Toyota, which is exogenous. Canadian Toyota dealership's service center currently provides valuable, timely feedback to Toyota on what they are seeing in the field. That said, it has also enjoyed much support from the U.S towns and cities in which it has operations. Hence, both TMMC and the U.S receive a 4. Since this is a moderate consideration, the criterion weighs a 3. Another external factor is that of transportation logistics. This is very important for "just in-time" component delivery, as well as vehicle distribution, and having a direct rail link to the factory is crucial in facilitating these activities (McCallum, 2004, p. 5). TMMC has such a link (Martin, Weber & Vink, 2009). Most U.S. facilities do so, as well. Highway and air links are also vital. Both the Canadian and most U.S. facilities are located near or along major roadway arteries. However, TMMC is also near several major airports and not all U.S. facilities can boast that, e.g., the new facility in Tupelo, MS. Hence, the edge would go to TMMC with it receiving a 5 and US facilities receiving a 4.

Since this criterion is extremely important, its factor weight is a 5. Corporate taxation rates are also of concern when selecting a location and are exogenous. Canada's average combined national and provincial corporate tax rate is 36.1% compared to the U.S average rate of 39.3%. Overall, in regards to the average corporate tax rate for all economically developed nations, the U.S. has the second highest rate and Canada the fourth. In fact, 46 states, including Kentucky, Indiana and California, all rank above Canada. Furthermore, the lowest of those three states, Kentucky, is still at 38.9% (Hodge, 2008, paras. 5-18). Therefore, in this factor, TMMC would rank a 3 and the U.S. a 1. Since taxes eat into overall profitability, this criterion is weighted a 4.

A further external factor is labor law. This factor relates to providing flexibility in regards to the labor market while balancing the needs of employers, employees and, if necessary, unions. In regards to this, the U.S. would rank a 4 and Canada a 2. The best states for this criterion are the right-to-work states and they rank higher than any Canadian province. In fact, only Alberta ranks above any U.S. state ("Labor Relations," 2009, p. 44). In regard to national laws, the ones in Canada are considered much more rigid. This factor is important as flexibility in labor arrangements have proven to provide greater economic benefit. In regards to weighting this factor, it would be given a 4 as employment flexibility is important to future earnings potentials.

In regards to endogenous criterion, excellence in manufacturing is at the forefront. It is the essence of TPS and hence, the factor gets a weight of 5. Both TMMC and U.S. plants have won numerous awards over the years, and continue to excel. TMMC management, in particular, has incorporated a successful use of Kaizen, which has made it very appealing to their Japanese based company; however, most of the sales figures show higher numbers in the United States manufacturing plants. Therefore, both operations receive a 4.

Toyota is constantly looking to improve its product, hence, research and development is another internal factor. TMMC has a proven network to aid its success research programs. This is evident by TMMC advancement in Toyota automobile cold weather affected car components. Furthermore, TMMC's Lexus division provides employees the opportunity to build prototype cars, something that may not be offered in U.S. plants (Martin, Weber & Vink, 2009). TMMC receives a 5 in this factor, the U.S. a 3. The weight for this factor is 3.

Another endogenous issue is the type of cars made at the plant. The Lexus RX 330 is still based on the Camry platform (Edmonds, 2006, para. 5). Hence, it would make sense to find plants that build that line of car because it is logical to assume the production line at those plants could be more easily modified to make the RX 330. This brand is made both in Canada and at Toyota's Kentucky facility (Stewart, n.d., pp. 18-22). However, TMMC is the only plant that makes Lexus models in the U.S. (Martin, Weber & Vink, 2009). With that in mind, it would seem then that the Canadian location would be preferable because it produces the Lexus brand. Hence, TMMC would receive an un-weighted score of 5 while the U.S. would receive a 2 because only one location produces the Camry and none produce the Lexus, thus severely limiting plant options for the latter.

Because of the huge cost and time savings associated already having a Lexus production line in place, the factor would weight a 5. Building upon this internal factor is another regarding the components built at the plant. If most of the major components for the Lexus RX 330 are built in the same location as where the car is put together, that should save time and money associated with shipping. In regards to TMMC, all major components are made at the Canadian factory except for the engine which is shipped from West Virginia, less than 500 miles away (Martin, Weber & Vink, 2009). Upon review, again, the Kentucky plant seems to be the best U.S. candidate as it makes many products, including the V6 engines, which are used in the model. However, the Kentucky operation does not appear to make transmissions or alternators, two other major components of the RX 300 ("Lexus Specs," n.d., para. 2) (Stewart, n.d., pp. 18-22). Based on this, TMMC would rank a 4 in comparison to the U.S. ranking of 3 on this criterion.

Because building most components in a single plant would be very important to cost and time efficiency, this factor would also rank a 5. Weighted Scoring Model Based on the discussion above regarding grid analyses and the scores provided, an un weighted grid can be constructed by placing the options, TMMC or the US, at the top of the table, much like an x-axis. Then, on the y-axis, all significant factors for site selection are listed. At the intersection of each factor vis-à-vis the options, the individual scores for each factor option can be entered.

Then, to figure out the weighted score for each option-factor criterion, weights are provided for each factor based on the discussion above. Then, each individual option-factor score is multiplied by the weight for the applicable factor. All weighted criteria scores are subsequently totaled to provide a total weighted score for both TMMC and the U.S. The final weighted score for the TMMC is 189 and the US is 147. Because TMMC is greater than the U.S., it should be selected. With the review and approval of executive management, it is recommended that TMMC produce the Lexus RX 330 line instead of a U.S. plant. This recommendation is based on the totals provided in the weighted score analysis which shows the TMMC plant has an advantage when compared to the U.S. plants. The advantages of using TMMC to produce the Lexus RX 330 include better climate conditions, a

lack of unions and a better transportation infrastructure. Some disadvantages for TMMC are the exchange rate and labor laws. However, the overall weighted score favors TMMC.

Nemawashi and Ringo-Sho

While based on a grid analysis, the recommendation that Toyota build its Lexus RX 330 at its Canadian plant does not mean that the company will necessarily do so. Toyota, while an international company, is very much grounded in its Japanese roots. As such, it is imperative that North Americans making the plant recommendation understand and respect this. Solely by presenting what is believed to be a systematic review of site selection criteria is insufficient to receive executive approval for TMMC. It is imperative that the time honored processes of consensus building, which include nemawashi and ringo-sho, are followed.

Nemawashi is a "semi-formal" but systematically sequential process in which approval of a proposed project is gained from all relevant stakeholders prior to the project's commencement (Fetters, 1995, p. 376). While it works towards consensus, its primary goal is consult all applicable decision makers to arrive at an overall plan or proposal that will gain approval from all necessary hierarchical levels (Stewart, n.d., p. 4). Hence, prior consultation with internal stakeholders is required. Therefore, when looking to gain acceptance for a suggestion, one should secure input and cooperation from affected superiors, gain a full understanding of concerns as they are raised, work to mitigate issues and opposition when possible and build a broad consensus prior to officially submitting a plan (Fetter, 1995, p. 377). While this can be time consuming process, it is imperative that this is done prior to any formal meetings. Unlike American meetings, which in many cases are forums to brainstorm and exchange ideas, the Japanese equivalent is very different. In the latter, all participants expect to be fully briefed prior to the gathering and come to it with opinions already formed. By coming to a sort of consensus before the meeting, acrimony and embarrassment are avoided and group harmony is maintained ("Nemawashi," n.d., paras. 1-2).

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