

**COLLEGE OF ENGINEERING & ARCHITECTURE**

**UCD SCHOOL OF MECHANICAL & MATERIALS ENGINEERING**

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| ***I declare that the material contained in this project is the end result of my own work and that due acknowledgment has been given in the bibliography to ALL sources, be they printed, electronic or personal*** | *Durgesh Ramani* |

**1. Introduction**

Scotts Miracle Grow Company (Scotts) is the largest company of North American garden and lawn industry supplying and marketing consumer products for lawn and garden care along with horticulture. The conglomerate was formed by merger of Miracle-Gro and The Scotts Company in 1995. The Scotts Company had also acquired Republic Tool & Manufacturing Company (RTMC) in 1992.

Scotts currently had a manufacturing plant in Temecula, CA, USA which produced all of the domestic lawn seed and fertilizer spreaders sold. As the costs of manufacturing in US was high, the director of operations, Mr. Bowcombe, at Temecula plant was under severe pressure to justify the price tag. Although there were many ongoing design and quality improvements which reflected in cost savings, the higher management seemed eager to outsource or offshore entire Temecula operations in China.

There are many variables involved in this decision besides cost like company’s long-term strategy, the delay and dependency in supply chain, environmental effect, reputational issues, China related risks like currency variations and other policies impacting cost of manufacturing. Although Mr. Bowcombe was keen on continuing the operations or go for offshoring, analysis is done below to take into account various factors mentioned above to help management arrive at decision to continue/outsource/offshore.

**2 Analysis**

This section describes impact of strategic move to China for manufacturing the spreaders- by the virtue of either outsourcing or offshoring. It also details how the cost pans out over 10-year horizon. Please note inflation is assumed to be same across both countries and not factored into this analysis. Also, all multi-year changes are spread evenly across all years.

*2.1 Offshoring & Outsourcing*

Strategic changes are involved while moving operations from Temecula to China, either via offshoring or outsourcing. Below are some opportunities and threats that can be thought of, along with some factors that are considered for this case study.

*2.1.1 Strengths*

Cost reduction: Majority of the costs in Temecula are lease, labour, and overhead (Pie Chart 2)and outsourcing it to China reduces all 3, which completely offset extra costs added by China production like freight and FX fluctuation cost of Yuan. The analysis is in sections 2.2 onwards. The cost reduction is in the range of around 20% when compared with Temecula plant.

Focus on “core competency”1: When it comes to manufacturing of spreaders, Scotts can focus on design of spreaders- outsourcing its manufacturing and focusing on “core competencies” of design (assumed core competency) and leveraging the wide distribution network to sell those which is a given competency for Scotts. Outsourcing as well as offshoring lets Scott deploy more resources on generating value in long run.

Flexibility: It allows Scotts to change its supplier to new location/entity if they are able to find a vendor with better cost, quality and lead time metrics without adding a lot of additional overhead.

Capacity Aggregation2 (p 431): Moulds can be reused to make some other items (if possible) and achieve economies of scale, especially if the product like fertilizer spreader is seasonal.

*2.1.2 Weaknesses*

Lengthy and brittle supply chain: The supply chain overall becomes lengthy by almost 2 months but with this item being non-perishable, Scotts works around it by having buffer stock at all times. The brittleness also increases with addition of third parties

External country challenges: Scotts will entail the risks of changing FX rate of Yuan, along with any economic, social and political events in China impacting operations of the factory. It also adds overhead of export and import although duty is not applicable. Sometimes it becomes difficult to communicate with people having different language and cultural values also need to be learned.

Quality issues: Scotts had occasional quality issues when it came to suppliers. It becomes more than critical to find out if the quality meets standards set by Scotts otherwise Scotts would have reputational loss.

Operational overhead: To find and manage additional vendor and their quality or even entire entity in case of offshoring is big operational expense which is time and resource intensive.

*2.1.3 Factors considered*

Long-term strategy: Looking at history of Scotts’ formation with merger with first RTMC and then with Miracle-Gro, vision to vertically integrate is observed. Miracle-Gro which was founded 83 years after the inception of The Scotts Company seems to have contrasting strategy focussing on niche in lawn care chemicals until its merger into Scotts. It is also important to know if it is planning to enter any new market like Asia, then offshoring in China would create more long-term value but with lawn care catering to higher economic strata, it remains to be seen how effective the product would be in developing countries. Otherwise, if they want to open/expand market in say Mexico, near-shoring would create more value and avoid the humongous freight costs from China. Lastly, they can also look at where manufacturers of Miracle-Grow are set-up and it can target that region for their own vendors. This can leverage internal synergies to optimize freight if less than truckload (LTL) shipments are existing.

Avoid in-mould labels: As in-mould labelling technology does not add much practical value to end user or company, marketing it as a feature is futile. In fact, it adds complexity and perhaps tightly coupled vendors with long term contracts3. This also reduces specificity of assets involved2 in process which in turn helps a high scale company like Scotts having predictable demand when cost of capital is high for Chinese third party. We can also think of it from a platform perspective4 where a spreader manufacturer can be easily changed. It helps to ignore 400k mould cost in 2010 and 2015 in any of the calculations, which anyway remains same for US.

Seasonal Sales: Spreader is widely used in spring time in North America and it is expected to have peak demand during that season5. If that’s the case then operating factory for entire year is not financially viable solution, outsourcing it would help from operations point of view. Before making decisions, it is important to look at the numbers and also it would be good to have sales numbers for spreaders but looking at overall sales of company, it can be assumed that sales for spreaders are linear (Table 8).

Document tacit knowledge: Spreader assembly and in-mould labelling knowledge needs to be documented, preferably in CAD like software which is easy to transfer over internet. As integration with supplier can be encapsulated in a well-defined set of digital files like CAD designs, thus R&D and manufacturing do not require close cohesion3.1.

Environmental impact: If we look at outsourcing cost (Pie Chart 2), more than 50% of the cost is driven by freight. Extra freight not just costs money; it also increases carbon footprint of Scotts as Carbon Emission is zero-sum game. In case Scotts wants to reduce its carbon emissions, decentralized decision system in outsourcing would be more beneficial which should save some more carbon6.

Import rate and regulations: Although there is no import duty on agricultural products and has a low probability of changing in future, the risk of tariffs still lurks and tomorrow if some existing or new product is categorized as non-agricultural causing price rise.

Reputation: Probably the biggest short-term impact is caused on reputation, which might not recover in short time span. It can range from stock price going down (eating into shareholder equity value) to reduced sales. Scotts has to tactfully avoid negative publicity and/or any local worker agitations or resistance which dents the image of brand almost permanently. Such types of situations can be avoided by having a phased approach of 2 years Temecula + 8 years outsourcing (Table 7). Offshoring does save the blushes as the eventual revenue is going back into the USA.

*2.2 Financial Analysis - Temecula*

Table 1 shows the analysis and below are the heads under which cost is considered for analysis along with the assumptions-

1. Raw materials: are assumed to be 0 as price is same globally, considering 100k savings due to regrind.
2. Lease cost: Although the lease ends in 2015, the 3m rate is assumed to be same for 2016 and 2017.
3. Employee salary: Cost for 2008 goes like 125k\*16 which is 2m. The productivity gain is offset by 3% labour price hike, hence -3 hike in first 5 years and 0 in next 5. Even though full-time employees are retained, this is cost calculation and more temporary employees might be let go to make up for 3% increase in retained employees.
4. Temporary labour: Same productivity related assumption for employees. Reduced number of employees are not taken into consideration for simplicity of calculations as the outcome would yield same end result.
5. Electricity fixed: This is fixed cost of electricity doing 8m\*0.16 for first year and then 2.5% uniform increase across 10 years to factor for 25% overall increase.
6. Electricity surcharge: It is assumed that the surcharge remains same as the consumption remains same for 2008 and 2009 and no other surcharge is due until 2017. 2.5 cents\*8m kwh giving 200k.
7. Overhead fixed: This is the HQ overhead which could be ignored as it is same even when offshoring or outsourcing is done but considered to get better absolute number, without raw material cost.
8. Overhead 30% of labour and electricity: It is assumed that electricity as the cost of fixed and surcharge here.
9. Capital improvements: This remains constant for all 10 years, 500k for internal plant.

Basic assumption across entire section 2 is that all values are calculated on annual basis even though certain payments like salary and electricity may not have yearly payment frequency- discounting at such granular level is ignored. After discounting future cashflows, the net value comes to around 84m USD as of June 2007.

Table 2 showcases cost of NOT doing any improvements over the 10 years in labour productivity and electricity. In this case, Scotts bleeds around 90.5m. Thus, Bowcombe and team are effectively saving 6.5m USD as of today due to improvements. It helps to gauge importance of talent and equivalent savings in case offshore model is used.

*2.3 Financial Analysis – China (Outsource)*

Basic headings in Table 3 viz. raw material, lease cost, labour cost, overhead, electricity (no surcharge) remain same with change in values from China, there are some aspects which were not required for Temecula with deletion of electricity surcharge. Below are the headings which require change or explanation:

1. Raw materials: 100k difference is added here as regrind technology is not available.
2. Labour cost: assuming the lower productive workers work 44 hours a week, the calculation for labour cost goes like 211\*0.91\*44\*52 where 211 is the total number of employees in Temecula (195 temp + 16 employees) and 52 weeks are same as Temecula plant as productivity of workers is already considered in weekly calculation. Also 40% increase is distributed evenly across 10 years.
3. Contractor margin: It is given as 8% and it is calculated on for the resources under contractor’s ownership i.e., lease cost, labour cost, overhead of management, and electricity.
4. Freight and Freight offset: freight is 3% increase compounded until 2008 to start with. Offset is the savings of 1m as of 2008 which would again increase by 3%.
5. Lead time offset stock: the value of stock to be stored in US to offset lead time differential of 8 weeks to ship from China. The overall sales are linearly increasing, so it is assumed that this value remains constant over 10 years.
6. Capital for improvements: R&D for China reduces to 300k compared to 500k of Temecula.
7. FX multiplier: Yuan is expected to increase by 20% in 5 years so the total amount is multiplied by that factor to consider FX fluctuations. It is assumed that it increases by another 20% in next 5 years for the sake of simplicity.

Discounting all the values, 64.7m is obtained which is roughly 25% reduction over Temecula plant’s cost of 84m. Sensitivity analysis is done when all the factors increase or reduce at the same time in Table 4 and Table 5 to get an idea of how the risk changes when the estimates go wrong by around 20% on either side, and difference of 1.8m on either side of our outsourcing estimate is seen. Underlying assumption is that all 3 factors are correlated- wages, electricity and Yuan. It would be very rare to have wages increasing at or below estimated rate when Yuan and electricity are rising above estimate, for example. Also, general administrative cost of finding and maintaining the vendor, the recurring costs and the Temecula closure overhead is ignored, which when added to actual figure, might go to around 70m as of today.

*2.4 Financial Analysis – China (Offshore)*

Offshoring to China (Table 6) is very similar to outsourcing except for addition of 8M upfront cost of setup and omission of contractor commission as no contractor is involved. The capital for improvements would remain 500k as the ownership remains with Scotts. All other costs including overhead costs would remain same. Absolute cost exceeds outsourcing number by 7.3m, which is driven by 8m discounted for a year and rest of the figure impacted by removal of commission. Offshoring could save cost in very long term as contractor margin is just 1.25% of total setup cost assuming interest income and discount factor for future payments is almost same, it would take years to recover the revenue invested. The factors that are not included in financial summary are:

1. Sensitivity Analysis around fluctuation of Yuan, labour costs in China and the electricity costs, but it would cause similar effect of around 1.8M on positive or negative side.
2. Overhead of hiring various employees, corporate office etc. along with their recurring costs as details are not provided.

**3 Recommendations**

Below are the recommendations in descending order of their importance:

Outsource to China in 2008: Outsource the manufacturing process to China without the in-mould labelling mechanism. Although the cost benefit of 20% is not as lucrative as it looks over a 10-year time span, it definitely positions Scotts a “Sustained Competitive Advantage” [n] and positions it to create more value in its distribution side network. It does entail environmental and reputational risk but if it helps the company in the long run, it might be worth taking the plunge.

Outsource to China in 2010: This increases the cost as of today by around 9m but it subdues the reputational risk by some major factor if workers are given a prior notice about closure of plant. This gives employees time to think about alternate opportunities and Scotts more time to decide on vendor better vendor and place along with time to transition any knowledge from Temecula to China.

Continue at Temecula: This option is to continue with Temecula operations and try to optimize it further. In case Scotts uncovers any custom use case for in-mould labelling like printing customer’s name/initials and save significant cost or have unique feature to sell, they can patent such technology and then leverage it as a platform and let other competitors use it and earn loyalty money out of it. This also means in long term in case they want to switch after widespread usage of their technology, they can leverage existing moulds of suppliers to outsource some or all of their operations.

**4 Conclusions**

It is understood that a trivial decision like build vs buy can have profound ramifications going various levels deeper than simple cost analysis. It can make or break supply chains and even entire companies. It is vital for managers to keep this in mind and even though company strategy sounds a bit fuzzy initially, delving into it gives a lot of insights, and list of such insights is never exhaustive. Another lesson is that it might sound a bit harsh on Mr. Bowcombe and team, business decisions are never taken with emotions but with quantitative analysis combined with mind open to various possibilities- threats as well as benefits.

The next steps involve taking some real-world use cases of offshoring, outsourcing, nearshoring and even staying in the same location- and quantify the qualitative aspects like reputation loss in terms of say stock price, environment impact in terms of carbon tax and so on and come to device a model around better decisions could be made around onshore or outsource or offshore or near-shore. More emphasize can be given on near-shoring and offshoring aspects which were not covered in depth in this use case.

**Appendix 1**

Table 1: Remain in Temecula (standard)



Table 2: Remain in Temecula (without improvements)



Table 3: Outsourcing to China



Table 4: Outsourcing to China (overestimate)



Table 5: Outsourcing to China (underestimate)



Table 6: Off-sourcing to China

**Appendix 2**



Table 7: Temecula 2 + outsource china 8



Table 8: Sales Projected Pie Chart 1: Temecula Cost Split Pie Chart 2: Outsource Cost Split

