

Capacity Management and Make-vs.-Buy Decisions

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Topic Area: Sourcing, Case

Summary: This thesis takes a fresh look at the Make-vs.-Buy decision making process. We examined current hypotheses used to guide the decision making process, and tested them using product data. Furthermore, we looked at two different companies and examined their decision making processes. Finally, we developed a framework to help with the decision making process using intrinsic and extrinsic advantages. We also developed a model, based on the hypotheses, to evaluate the decisions.



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KEY INSIGHTS:

1. Managers use hypotheses to guide their Make-vs.-Buy decisions – quantity, costs, boom/bust cycles and their interconnectivity. However, data suggests that there is more.
2. The decision factors are divided into intrinsic and extrinsic. Intrinsic advantages weight the strategic and technological factors, while extrinsic measure the market and economic factors.
3. The final score is a weighted average of each segment. The final decision can be: Make, Buy, Contract to buy, or Contract to sell.

Introduction

FieldServ., an oilfield services company, is currently experiencing an industry downturn. With oil prices reaching a low of \$29 per barrel, FieldServ. decided to use a Make strategy during the downturn, despite the higher prices and longer lead times.

FieldServ. approached us with the question of what they should do when the industry returned to its pre-Bust norm. Should they continue to insource (Make) or pursue a Buy strategy?

Based on the above questions, our thesis centered on determining when it is more advantageous to use a “Make” strategy, and when it is more effective to “Buy.” We explored the different practices used by various companies in different markets and industries. Furthermore, we developed a method to analyze and determine best strategies when a

company is faced with a “Make-vs.-Buy” decision. Finally, we analyzed the different drivers in a Boom and Bust cycle.

Methodology and Data

The goal of our research was to identify the key indicators that influence the Make-vs.-Buy decision and how these indicators change during a Boom/Bust cycle.

To understand the factors for evaluating the problem statement (Should we make or should we buy?), we conducted an interview research at FieldServ. A qualitative interviewing technique best suited the needs of our research to develop the problem holistically. We interviewed Insourcing Category Managers and Global Sub-category managers to understand the rationale behind the existing insourcing and outsourcing process in the company. We also interviewed the manufacturing managers to explore the flexibility in their operations. The information gathered from the interview clarified the different manufacturing models employed at each product line, from fully vertically integrated to externally integrated, and OEMs.

Furthermore, we conducted a case-based analysis of different industries to understand the strategic outcomes. We critically analyzed the business practices followed in industries such as the aviation industry, consumer product goods, and others, which have a similar cyclical and seasonal upturns and downturns in their business similar to those in the oil field services industry.

Lastly, we created an analytical model that showed how the different factors – Costs, Boom/Bust cycles - can contribute to the decision-making process. This model focused mostly on the cost structure of the decision.

Following our research, we analyzed existing data of 4 different products, provided by FieldServ, to test the hypotheses of company personnel that Quantity, Cost and Boom/Bust cycles are interconnected and guide the decision-making process. We also developed

an analytical model to test the above hypotheses.

Interviews

During our first meeting with the category managers at FieldServ., we learned that during the current Bust cycle, internal sourcing, or Make, is more preferred to external, or Buy, even though internal prices are at four times multiple, compared to external, and lead times are much slower internally. When we asked the managers for a reason, they provided the following:

- a. External prices are cheaper now; however, during Boom periods, those prices will increase past internal prices, which are relatively stable.
- b. Internal production needs to continue at minimum sustainable levels in anticipation for ramp up periods.

After our on-site visit, we concluded that FieldServ. practices need to be evaluated. We wanted to understand whether the current insourcing decision is justified, particularly since its cost and lead times were not ideal. Furthermore, we wanted to provide metrics that can help make an objective decision during the next ramp up period.

Common Hypotheses Tested

We tested 3 sets of hypotheses:

1. Managers believe that quantities ordered vary with Boom/Bust cycles, which in turn varies external pricing.
2. Managers believe that external pricing rises during boom cycles and falls during bust cycles.
3. Managers believe that internal sourcing has a unified price that does not change with the Boom/Bust cycles.

We ran a regression to evaluate the Quantity and Cost hypotheses, and we charted the

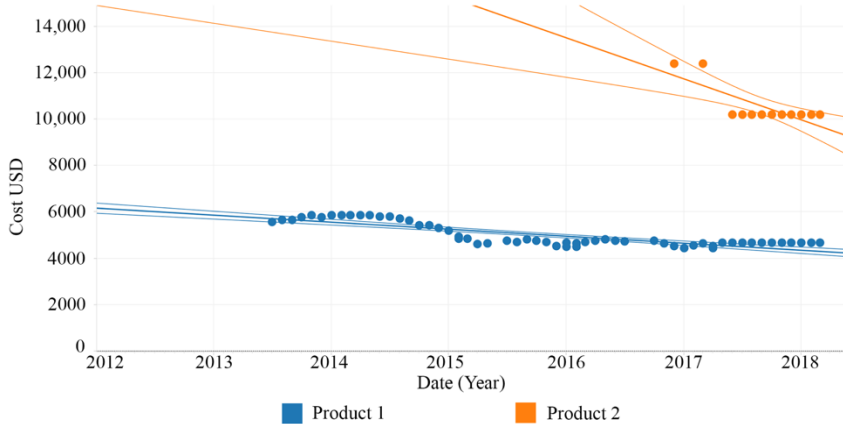
Internal pricing hypothesis, Figure 1 shows the results for all three hypotheses.

Aggregate - Summary of Fit	
RSquare	0.001239
RSquare Adj	0.000135
Root Mean Square Error	2.362735
Mean of Response	2.568908
Observations	907

Regression for Quantity and Boom/Bust Dummy Variable

Aggregate - Summary of Fit	
RSquare	0.046494
RSquare Adj	0.04544
Root Mean Square Error	6295.048
Mean of Response	8385.331
Observations	907

Regression for External Cost and Boom/Bust Dummy Variable



Graph showing internal price fluctuations over a period of 5 years.

Figure 1 Results for Hypotheses Analysis

The results show that Hypotheses 1 and 2 were not the case for the products provided. Hypothesis 3 also had exceptions.

Case Studies

We examined two cases: Boeing and its outsourcing strategy for the 787, and a world class Consumer Packaged Goods (CPG) provider. We discovered that usually, core

competency was the main evaluators, followed by a set that was unique to each company and industry. We also discovered that exceptions are fairly common, and that decisions are not absolute. Hybrid strategies exists.

Results

Our analysis led us to a new segmentation for decision factors:

Intrinsic advantages: Advantages gained by internal dynamics. For instance: manufacturing strategy, intellectual property rights, technological factors. The factors deal heavily with the business composition, competitive edge and strategy.

Extrinsic advantages: Any advantages that are gained by market conditions. For example: market cost, or any advantage earned due to external conditions.

Following that segmentation, we further drilled down into four distinct criteria: Strategic and Technological factors fall under the intrinsic segment, while Market and Economic factors are extrinsic factors. Figure 2 demonstrates the factors and their relationships.

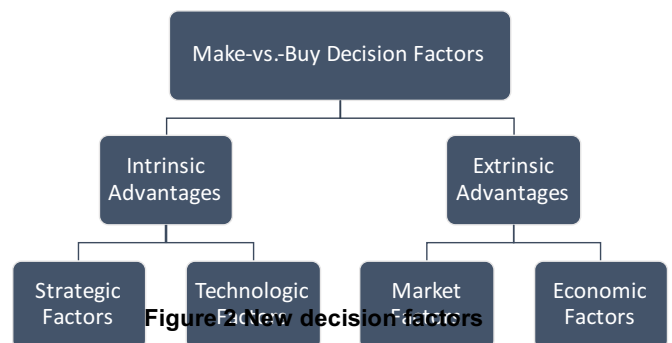


Figure 2 New decision factors

Furthermore, we have created an evaluation sheet that provide certain questions to be answered in each of the four criteria. Once all segment questions have been answered, the results can be applied to the 2x2 matrix shown in Figure 3. The matrix will provide a better sense of what should be done. We have identified four possible outcomes:

1. **Buy Outright/Divest:** Products in this quadrant typically have low strategic value to the company. They also have no market or economic advantage and therefore, must be procured from external suppliers.
2. **Make Outright/Invest to make:** This segment has the company's top products, differentiators, or the company's core competency and company must invest to make these products in-house.
3. **Contract to Buy (Strategic alliances):** This product quadrant is important to the company's core business; however, the company has a low competitive advantage and low economies of scale to manufacture the product. The best course of action is to partner with a manufacturer through contract manufacturing.
4. **Contract to Sell (Industry alliances):** This product category has less importance to the core business, or doesn't leverage the company's core competency. For instance, byproducts in a pharmaceutical industry are a part of the manufacturing process and have low strategic advantage. However, the company has economic advantages from manufacture it in-house as it can sell its excess at a markup to other industries or competitors.

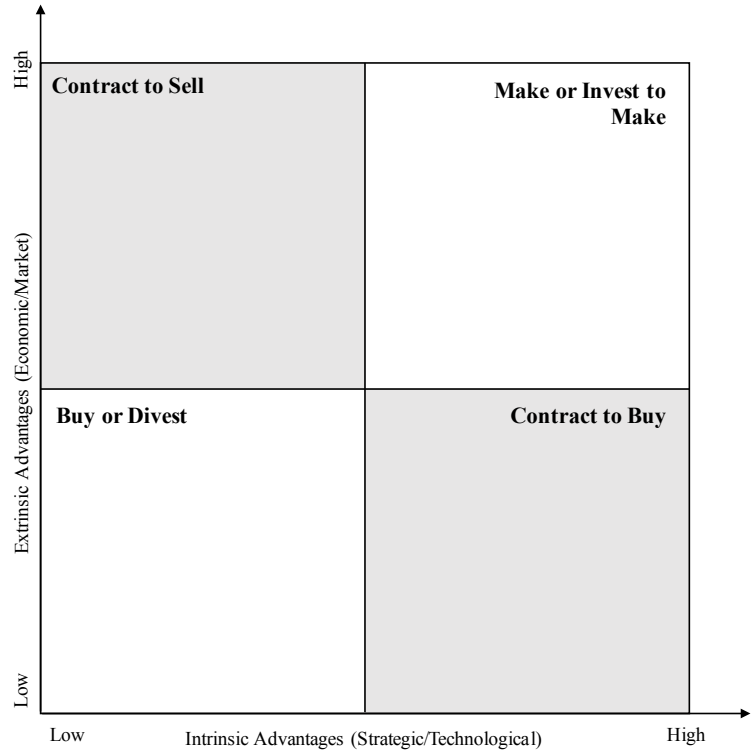


Figure 3 2x2 matrix

Conclusion

This research has provided ground-breaking insights into factors of strategic procurement in oil and gas as well as industries such as pharmaceutical, healthcare and the airline industry. Our research offers in-depth insights to supply chain managers in industries to help them make an informed make or buy decision for capacity management.