Final – Investing in a new remelt shop

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Overview

For the final BOCR project, we modeled the decision-making process for investing in a new remelt shop, a decision made by Joe's company in 2017. A remelt shop for a steel mill can melt steel again to further clean and improve the mechanical properties of the material. This is essentially for critical aerospace, defense, and oil/gas materials which allows a company to grow into new markets. For background, the decision was made to invest in a brand new remelt shop with supporting equipment.

Strategic Criteria

- Develop Workforce
- Increase Market Share
- Increase Profits
- Technology Leader

Alternatives

The alternatives for the project will be…

1. Build a new remelt shop with supporting equipment.
    a. High upfront cost, but would provide with the latest and greatest equipment and quality. Also allows for flexibility in design given new installation
2. Add on to existing capacity with used equipment.

a. Adds capacity with less upfront cost. However, the equipment is used and provides less flexibility

3. Develop options for subcontracting of critical components.
    a. Work with existing capacity to gain access to equipment on a purchased basis while requiring no up-front investment. Pay margin to competitors/vendors over time at a higher cost making the company less competitive
4. Do nothing.

These alternatives represent options that would have been presented at the time of the project proposal. Further scope would have entailed the budget, projected return-on-investment, and initial work on the costs.

BOCR

The benefits, opportunities, and costs are broken down according to the tables below. Further criteria are broken into clusters for easy comparison to similar effects on the business.

Benefits					
Financial		**Operational**		**Organizational**	
Sales	New Customers	**Material Defects**	Cleanliness	**Workforce Development**	Cross Training
	Profits		Material Quality		Lean Organization
	Support Existing Customers		Rejection Rate		Opportunities for Advancement
Costs	Logistics	**Logistics**	Freight Moves		
	Subcontracting Fees		Work center Scheduling		

Table 1: Benefits Breakdown in-model

The benefits were each sectioned according to financial, operational, and organizational benefits of the alternatives. Financial benefits included cost-direct factors such as new customer acquisition, profits, logistics, and subcontracting. Operational benefits had an impact on the bottom line, but also focused on day-to-day transactions such as freight moves and work center scheduling capabilities. Organizational benefits focused on the people aspect of the decision.

Opportunities			
Financial		**Operational**	
Profits	Capacity Utilization	**Data**	Material History
	Cost Structure		Systems Information
	Grades Produced	**Scheduling**	Capacity Planning
	Technology Advantage		On-time Delivery

Table 2: Opportunities Breakdown In-Model

The opportunities were broken out to improvements that may be realized/unrealized as a part of the decision-making process. For example, the building of new equipment will improve systems information, leading to increased capacity planning capability with a technology advantage. This factors into the building new vs. used decision, in addition to comparing with the extra hassle of moves associated with the new equipment.

Costs			
Financial		**Organizational**	
CAPEX	Equipment	**Employees**	Cross-Training
	Equipment Maintenance		Productivity
	Free Cash		Staffing Levels
Operations Cost	Consumables	**Management**	Strategic Initiatives
	Outside Vendors		Workforce Engagement

	Production Costs		

Table 3: Costs Breakdown in Model

The costs are broken down accordingly to financial and operational issues facing the decision maker. For example, outside vendor costs is a very large factor when looking at building the remelt shop vs. outsourcing the work to another company, who is potentially a competitor in the market. Additionally, the strategic initiatives for the organization would need to be put on hold while this large endeavor takes place, limiting the action that can be taken.

Risks					
Financial		**Operational**		**Organizational**	
Cashflow	Assets	**Equipment**	Breakdowns	**Engagement**	Change
	Investment Potential		New Technology		Compensation
	Liquidity		Operator Errors		Employee Excitement
Market	Financial Stability	**Grade Mix**	R&D Expense		Training Time
	Macroeconomic Forces		Scrap Rate		

Table 4: Risks Breakdown in Model

Risks associated with the decision are further broken down according to financial, operational, and organizational criteria. The obvious risks for investing a large sum of money is with liquidity, asset management. Another factor is the macroeconomic forces in the market, seen with the COVID-19 pandemic causing the aerospace industry to grind to a halt in a matter of months. Other risks include cultural threats and other equipment, or operational challenges associated with new product lines.

Results

Each of the clusters were pairwise compared to each alternative within each BOCR criteria. After the pairwise comparison, the normalized overall results are shown below in Table 5.

	Benefits	Opportunities	Costs	Risks
Build New	41%	41%	20%	40%
Build Used	26%	17%	11%	15%
Develop Options	7%	15%	27%	32%
Do Nothing	25%	27%	43%	13%

Table 5: Pairwise Comparison Normals Total Model

For each of the comparisons but costs, the build new alternative won the best choice. Having a unique perspective on the decisions likely contributed to the ratings made. Fortunately, the company is in very good financial health and could absorb an investment such as this without damaging operations or long-term fiscal liquidity, minimizing risk for the financial side. Additionally, the ROI for this equipment is very high, with several key customers having a pre-existing high demand for material that would immediately take up capacity in the new shop. The downsides, however are significant, in that the new shop would prove to be a logistical challenge with additional capacity planning and material movement.

Additionally, the strategic criteria were ranked per the below, with ratings based off the most important criteria within each subcluster.

Alternatives	Priorities	Totals	Develop Workfo... (0.0586)	Increase Market ... (0.1702)	Increase Profits (0.5511)	Technology Lea... (0.2202)
1.Benefits	0.4170	0.9803	Above Average	Hi	Hi	Excellent
2.Opportunities	0.3939	0.9261	Excellent	Hi	Hi	Above Average
3.Costs	0.0944	0.2220	Average	Lo	Lo	Above Average
4.Risks	0.0947	0.2226	Average	Lo	Med	Above Average

Figure 1: Ratings Model for Strategic Criteria

The ratings model coupled with the pairwise comparison yielded the below long/short term decisions.

Long-Term			
Name	Ideals	Normals	Raw
Build New	100%	44%	67%
Build Used	55%	24%	37%
Develop Options	13%	6%	9%
Do Nothing	59%	26%	39%
Short Term Solution			
Name	Ideals	Normals	Raw
Build New	77%	34%	244%
Build Used	100%	44%	315%
Develop Options	5%	2%	15%
Do Nothing	43%	19%	137%

Table 5: Final BOCR Model Results

In the long-term solution, the build new alternative won out with build used coming in first during the short-term solution. This likely was due to the short-term money hit of a used scenario being substantially less than build new, with most of the included benefits. However, in the long-term, the benefits of newer technology for operational issues would significantly outweigh the costs and potential maintenance of used equipment.

Analysis of the sensitivity shows that the biggest detractors to the build-new solution were in risks and costs – which makes logical sense. The risks and cost are steepest for this option, where its benefits and opportunities far outstrip the others. At higher levels of weighting, these two criteria show clear trends towards the do nothing and build used respectively dominate the discussion. In the figures below, the red line represents build new, blue is build used, black is develop options, and green is do nothing.

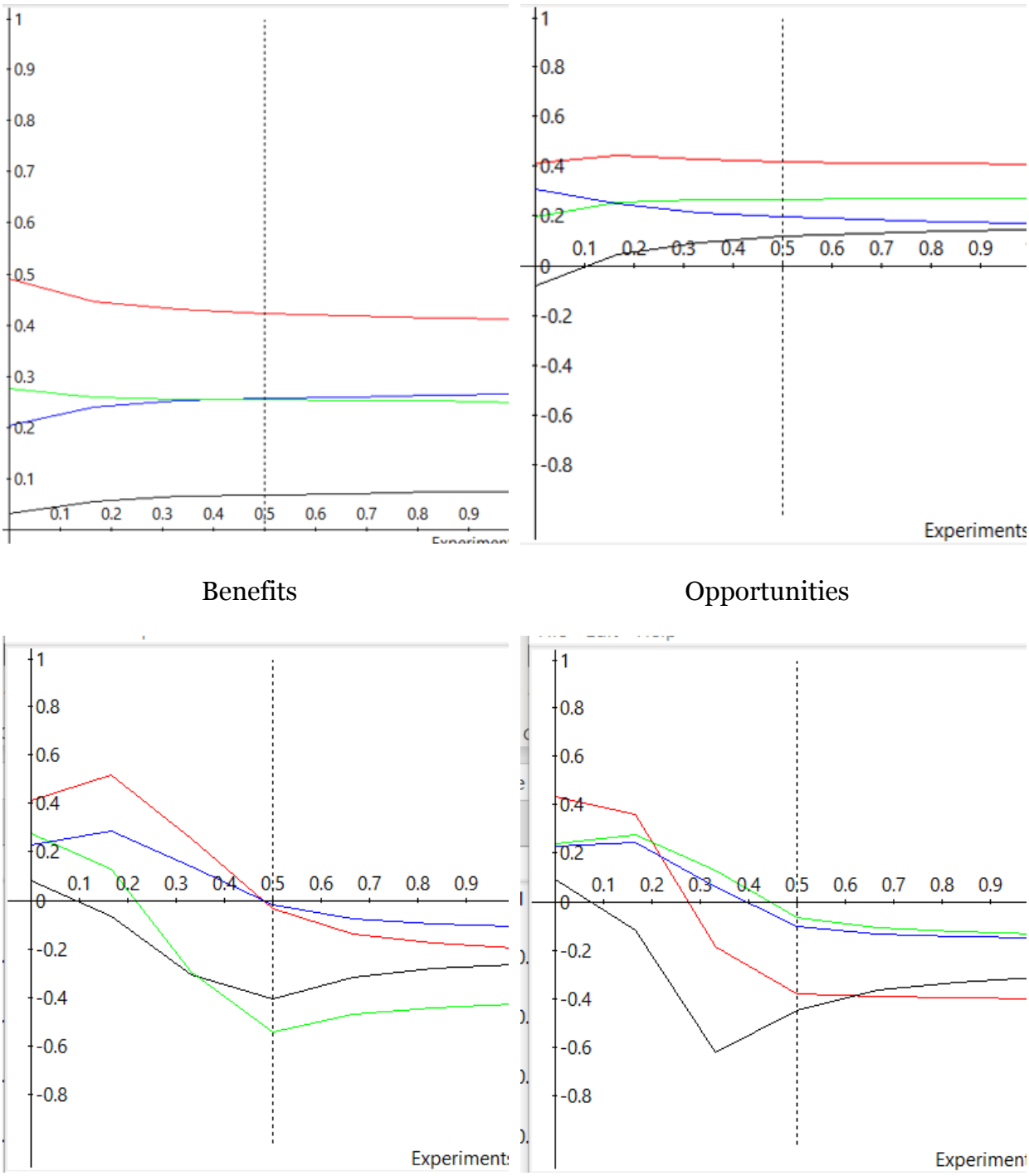

Figure 3: Sensitivity Analysis for Each BOCR criteria

In conclusion, the long-run decision reached by the model is to build a new remelt shop, with the short-run decision being to build a used remelt shop. Both of the

options present significant benefits and opportunities, but their risks are inherent due to the large upfront investment required in both cases and illiquidity for other CAPEX projects that might also provide value.