GENERAL MOTORS: SUPPLIER SELECTION FOR INNOVATION

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General Motors: Supplier Selection for Innovation

Introduction

General Motors (GM) needs to choose a supplier to provide the electronic brake booster for the Chevrolet Bolt EV. There are four suppliers in analysis, including Rosie Automotive, Elroy, R.U.D.I., and Orbitty. GM assumes a projection of 30,000 units every year, a five-year project life cycle, weekly delivery, 235 days per year of production, and a cost of capital of 15% is used in the analysis (Yan *et al.*, 2017). In this case study analysis, a quantitative evaluation of suppliers is subsequently followed by qualitative factors, and lastly, a combined recommendation is made in a scorecard approach.

Supplier Selection Based on Quantitative Analysis

In the case of only quantitative considerations, the decision majorly focuses on cost efficiency. This incorporates unit price, logistics, and holding cost of inventory. GM has a target price of $43 per unit, and the e-boost module is identified as the EV version, whereas the target price of the AV version is $53 per unit (Yan *et al.*, 2017). The cost of logistics is also increased by the distance of shipping and the customs process of the overseas suppliers. The cost of holding inventory is estimated to be 10% of the unit manufacturing cost per year, which is in line with industry practice. It is estimated that the EV and the AV will produce 30,000 units and 10,000 units, respectively, each year. All the calculations are based on the weekly production of 638 units and 47 working weeks each year, as demonstrated in the data provided. In Table 1, the summative quantitative expense of every supplier is summarized.

Table 1: Quantitative Cost Comparison

	Rosie	**Elroy**	**R.U.D.I.**	**Orbitty**
Component price (units/week)	$36,670.21	$28,244.68	$52,825.53	$28,238.30

Inventory Cost (5 years)	$40,703.94	$12,710.11	$15,847.66	$30,497.36
Transportation	$86.20	$90.18	$92	$106
Taxes and Duties	$443.31	$123.22	-	$457.25
Fees	200	200	-	200
Total costs	**$78,103.65**	**$41,368.19**	**$68,765.57**	**$59,498.86**

The findings indicate clearly that Elroy has the minimum total cost at $41,368.19. This is mainly because it has a low unit price of $44.25, and its inventory cost is not very high. There is also a low rate of taxes and duties that Elroy incurs since the production is in Mexico, where the duty rate stands at 0.80%. The summative price of Rosie is the most expensive, with a middle unit price primarily due to the high inventory charge and transportation out of China. Due to high duties, a longer transit period, and an expensive inventory, Orbitty is more costly than Elroy. The cost of R.U.D.I. is also high due to its high unit cost. According to the quantitative evaluation only, Elroy should be chosen, as it represents the lowest total cost and the most efficient cost structure.

Supplier Selection Based on Qualitative Factors

The decision becomes different when qualitative factors are considered. The main qualitative criteria are the ownership of intellectual property, technical ability, supply risk, customer service, and the strategic fit with the long-term autonomous vehicle objectives of GM. These aspects are paramount since in autopilot driving, the brake system is directly correlated with safety and software implementation. Rosie Automotive International is doing well in terms of manufacturing experience and cost efficiency, but does not offer intellectual property to GM (Yan *et al.*, 2017). It is a major drawback as GM has mentioned that software, data, and system behavior control are strategic in nature. Rosie Automotive International is also proposing the price to be increased following changes in the engineering, and this is worrisome as to the

reliability and trust in the long run.

Elroy International has an opposite supplier profile with its advantages and obvious weaknesses. It shares intellectual property, and the company is in Mexico, which lessens logistics risk compared to foreign suppliers (Yan *et al.*, 2017). Elroy, however, has little experience with the braking system and highly depends on purchased parts by Orbitty. It lowers the visibility between GM in the entire supply chain and generates uncertainty as to system integration and long-run performance.

R.U.D.I. Braking Systems possesses good technical credibility with GM. It has been able to produce prototype systems of the Chevrolet Bolt AV and cooperated with GM engineers throughout the development (Yan *et al.*, 2017). It is located in the United States, which lessens the line of supply and enhances communication. Nevertheless, R.U.D.I. does not feel free to share intellectual capital in the short term, and it is slightly strategic (Yan *et al.*, 2017). The company has been willing to collaborate in the future as soon as GM develops internal expertise.

Orbitty International is known as one of the industry front-runners in autonomous vehicles. It is also ready to sell intellectual property, but at a high price (Yan *et al.*, 2017). It has a high level of technical power and innovation. Orbitty has, however, a reputation for bad customer relationships and is seen to be challenging to do business with. It is also expensive and manufactured abroad, thus making it risky. Based on qualitative factors alone, Orbitty and R.U.D.I. are the strongest, due to operational trust and collaboration. The lowest-ranking company is Rosie Automotive International because it has restrictions in terms of intellectual property.

Final Recommendation Based on Scorecard Analysis

The last supplier decision is arrived at after an evaluation of the quantitative cost analysis

and the qualitative assessment of the strategic factors. Based on the quantitative analysis, Elroy International has the lowest cost of the total project life cycle, despite its low unit price, as well as moderate inventory costs and logistics costs. Nonetheless, the price is not a critical requirement of a safety-critical component employed in an autonomous vehicle. The ranking of suppliers is also different when qualitative factors are also incorporated, such as intellectual property control, technical maturity, supply reliability, and quality of relationships (Wu-Smith *et al.*, 2023). According to Table 2. Weighted Supplier Scorecard, R.U.D.I. Braking Systems has the highest total score, although it is not the cheapest option. This finding can be attributed to the greater weight attributed to technical capability and supply risk, which are critical to autonomous braking systems.

Table 2: Weighted Supplier Scorecard

Supplier	Cost	IP	Technical	Risk	Relationship	Total
Rosie	2	1	4	2	3	2.4
Elroy	5	4	3	3	3	3.6
R.U.D.I.	3	2	5	5	5	4
Orbitty	4	4	5	2	2	3.4

R.U.D.I. is suggested to be the last supplier since it offers the most favorable performance/risk/long-term strategic fit. Its success in the development and testing of prototype systems with the Chevrolet Bolt AV makes it less risky in terms of technical and safety hazards. Domestic production also enhances responsiveness and communication, which are essential in the initial production and refining of the system (Scott, 2022). Even though R.U.D.I. is not willing to share intellectual property within the short term, its readiness to do so in the future will support the long-term innovation priorities of GM. R.U.D.I. provides the most defensible and stable option to GM compared to Elroy, which is cheaper but has high uncertainty in technical factors, or Orbitty, which is highly innovative, high-cost, and service-risk.

Conclusion

The choice of the supplier for the Chevrolet Bolt EV braking system cannot be solely based on the cost factor. The ultimate action should safeguard the safety, minimize risk, and take care of GM's long-term strategy of innovation. Elroy, though the cheapest, does not have as good technical confidence and operational reliability as R.U.D.I. does. An alternative assessment demonstrates that their first consideration is performance, teamwork, and risk management, which is more sustainable and justifiable in sourcing decisions.

Reference List

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