

# Make Vs Buy Analysis In Automobile Industries

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**Abstract** - The make vs buy analysis is a critical decision-making process that organizations undertake to determine the most efficient and cost-effective approach to procuring goods or services essential to their operations. This explores the intricate interplay between cost, quality, and lead time in shaping sourcing decisions, delving into the multifaceted considerations and complexities involved in the decision-making process. Through a comprehensive examination of cost factors, quality considerations, and lead time dynamics, this study aims to provide actionable insights and practical recommendations for organizations navigating the complexities of strategic sourcing. By adopting a holistic approach to cost analysis, prioritizing quality assurance, and leveraging advanced planning and forecasting techniques, organizations can optimize their supply chain efficiency, enhance their agility in responding to market demands, and drive sustainable growth in an ever-evolving business landscape. This abstract encapsulates the key findings and insights from the thesis, offering a roadmap for organizations seeking to make informed decisions and achieve strategic alignment in their sourcing strategies.

**Key Words:** Cost Analysis, Fixed Costs, Variable Costs, Quality Control, Lead Time, Scalability, Supplier Reliability, Flexibility, Risk Assessment.

## 1. INTRODUCTION

The make-or-buy decision involves evaluating factors such as cost, quality, and lead time to determine whether to produce internally or outsource. Historically, companies favored vertical integration and in-house manufacturing. However, globalization and technological advancements have transformed the landscape, offering new opportunities for strategic sourcing. The study aims to delve into the complexities of make-or-buy decisions, focusing on cost, quality, and lead time. It addresses how these factors influence organizational strategies and operational efficiency. Objectives include comparing the cost, quality standards and leadtime of internally produced tools with those available in the market. The make vs buy analysis represents a pivotal decision-

making process for organizations, encompassing a comprehensive evaluation of internal production capabilities and external procurement options. Throughout this thesis, we have explored the intricate interplay between cost, quality, and lead time in shaping sourcing decisions, highlighting the multifaceted considerations and complexities that organizations must navigate to achieve strategic alignment and operational efficiency. The make vs buy decision-making process is inherently complex, requiring organizations to weigh a myriad of factors and trade-offs to arrive at an optimal sourcing strategy. Our examination of decision-making frameworks emphasized the importance of data-driven analysis, stakeholder alignment, and risk management in guiding strategic sourcing decisions.

## 2. LITERATURE REVIEW

According to Arora and Kumar (2022) discussed the impact of cost flexibility and responsiveness on make-or-buy decisions, advocating for strategic approaches that align with organizational goals and market conditions. Every enterprise will be based on the other enterprise to manufacture, product items/parts, for make or buy. The make-buy decision is based on the assessment whether it should be manufactured or buy it from an outside supplier to produce a component internally or to buy it from the outside. It depends on cost and profitability. The cost for both the alternatives may be calculated and the alternative with less cost is to be chosen. The aim of any enterprise is to improve its performance that is measured in terms of profitability. There is some research that has been carried out to make the decision based on profitability of the enterprise for make or buy decision. The strategy is based on cost, flexibility and responsiveness of work to be carried out. However, some of the research is required to maintain the relationship between profitability and make or buy decision. The reports of this paper attempt made on how buying decision influences the performances of an enterprise. The different sectors were chosen for the

study such as Manufacturing, Automobile, Food, Textile and Hospitality. The focus of the study was based on three theories such as operational control, performance management and decision. According to the research conducted by Rosyidi et al. (2018) developed a two-stage optimization model for make-or-buy decisions, incorporating quality improvement and learning curves. a make or buy analysis model is developed to determine an optimal set of processes and suppliers to minimize manufacturing costs, purchasing costs, quality loss, scrap cost and lateness cost considering the process capability, manufacturing capacity, customer orders, and the routing of the manufacturing process in the multistage manufacturing processes. The constraints of the model are the tolerance limits, process variance for each component, the production capacity of the machine, consumer demand, and the minimum number of machine/supplier selected. This model emphasizes the need for optimizing process and supplier selection to minimize costs and enhance quality. According to Moschuris (2015) examined tactical decision-making criteria in make-or-buy issues, highlighting the importance of cost, quality, and lead time in resolving these decisions. This study sheds light on the empirical assessment of these criteria in a real-world context. Moreover, it sheds light on the relationship between the impact of each criterion and a number of independent variables. Initially, depth interviews were made with purchasing managers in ten industrial firms operating in Greece. The findings of these interviews and the review of the pertinent literature provided the basis for the questionnaire design. Then, a copy of the questionnaire and a prepaid self-addressed return envelope were mailed to a stratified sample of 300 industrial firms operating in Greece. By the end of this process, 85 questionnaires were received, representing a 28.3 percent response rate. Cost and quality appear to be the criteria with the most impact, which indicates that companies usually resolve tactical make-or-buy issues in order to achieve short-term cost savings or operational advantage. According to Ilkka Sillanpaa (2015) The aim of this study is to analyse factors that are related to make or buy decisions. Within this research, a tool is created for make or buy decision-making which can be used as a help to evaluate outsourcing analytically.

### 3. RESEARCH METHODOLOGY

The research methodology used in this study comprises a systematic approach to gather, analyze, and interpret data to answer the research questions related to the make-or-buy decision in the automobile industry. This section outlines the procedures, tools, and strategies employed to ensure the validity, reliability, and credibility of the research findings.

#### Research Design

The study utilizes an analytical research design, focusing on evaluating costs, quality, and lead times associated with internal production versus outsourcing. Data is gathered from internal financial records, production reports, and quality assurance data, as well as from external suppliers through quotes and proposals.

#### Steps in Research Design:

##### Data Collection:

- **Internal Sources:** Financial records, production reports, quality assurance data.
- **External Sources:** Quotes, proposals, quality certifications from potential suppliers.
- **Interviews:** Conducted with key personnel from production, procurement, and quality assurance departments to gather insights and perspectives.

##### Cost Analysis:

- **Direct Costs:** Includes raw materials, labor, and equipment depreciation.
- **Indirect Costs:** Includes overhead, inventory management, and facility maintenance.

#### Formula for Cost of Making:

Make Cost (MC) = Direct Material Cost (DMC) + Direct Labour Cost (DLC) + Manufacturing Overhead (MO)

Make Cost (MC) = Direct Material Cost (DMC) + Direct Labour Cost (DLC) + Manufacturing Overhead (MO)

**Formula for Cost of Buying:**

Buy Cost (BC)=Purchase Price (PP)+Shipping and Handling Fees  
 Buy Cost (BC)=Purchase Price (PP)+Shipping and Handling Fees

**Quality Analysis:**

- **Quality of Making:** Evaluated based on the percentage of defects or errors in produced items.
- **Quality of Buying:** Assessed using supplier performance metrics like defect rates, warranty claims, and customer satisfaction scores.

**Lead Time Analysis:**

- **Lead Time for Making:** Time taken from the start of production to the completion of the product.
- **Lead Time for Buying:** Time taken from placing an order with the supplier to receiving the product.

**Formula for Make Lead Time:**

Make Lead Time (MLT)=Production Time (PT)+Material Procurement Time (MPT)  
 Make Lead Time (MLT)=Production Time (PT)+Material Procurement Time (MPT)

**4.DATA ANALYSIS AND INTERPRETATION**

**Metal Disc**

**Cost Analysis**

- **Internal Production:**
  - Raw Material Cost: ₹67,431
  - Labour Cost: ₹18,222
  - Overhead Cost: ₹2,422
  - **Total Cost:** ₹88,075
- **External Purchase:**
  - Raw Material Cost: ₹80,122
  - Machining Cost: ₹39,999
  - **Total Cost:** ₹120,121

**Quality Analysis**

• **Internal Production:**

- Material Quality: 100% compliance with standards
- Production Process Quality: 100% inspection pass rate
- Reliability: Customer satisfaction rating of 10/10

• **External Purchase:**

- Material Quality: 100% compliance with standards
- Production Process Quality: 100% inspection pass rate
- Reliability: Customer satisfaction rating of 10/10

**Lead Time Analysis**

• **Internal Production:**

- Production Lead Time: 20 days
- Transportation Time: None

• **External Purchase:**

- Production Lead Time: 24 days
- Transportation Time: 1 day

**Inference**

Producing the metal disc internally is more cost-effective than purchasing it externally. Both internal and external options meet the same quality standards, but the lead time for internal production is shorter. Therefore, the decision is to manufacture the metal disc internally.

**Mandrel Sleeve**

**Cost Analysis**

• **Internal Production:**

- Raw Material Cost: ₹78,290
- Labour Cost: ₹16,390
- Overhead Cost: ₹2,422
- **Total Cost:** ₹97,102

• **External Purchase:**

- Raw Material Cost: ₹79,482
- Machining Cost: ₹42,530
- **Total Cost:** ₹122,012

**Quality Analysis**

• **Internal Production:**

- Material Quality: 100% compliance with standards
- Production Process Quality: 100% inspection pass rate
- Reliability: Customer satisfaction rating of 9/10

• **External Purchase:**

- Material Quality: 100% compliance with standards
- Production Process Quality: 100% inspection pass rate
- Reliability: Customer satisfaction rating of 9/10

• **Internal Production:**

- Material Quality: 100% compliance with standards
- Production Process Quality: 100% inspection pass rate
- Reliability: Customer satisfaction rating of 10/10

• **External Purchase:**

- Material Quality: 100% compliance with standards
- Production Process Quality: 100% inspection pass rate
- Reliability: Customer satisfaction rating of 10/10

**Lead Time Analysis**

• **Internal Production:**

- Production Lead Time: 22 days
- Transportation Time: None

• **External Purchase:**

- Production Lead Time: 22 days
- Transportation Time: 1 day

**Lead Time Analysis**

• **Internal Production:**

- Production Lead Time: 22 days
- Transportation Time: None

• **External Purchase:**

- Production Lead Time: 17 days
- Transportation Time: 1 day

**Inference**

The internal production cost of the Mandrel Sleeve is lower compared to purchasing it externally, with both options offering the same quality and lead time. Thus, internal production is preferred.

**Inference**

While the lead time for buying the Bottom Flange Roll externally is shorter, the cost advantage and equivalent quality of internal production make it the preferred choice.

**Bottom Flange Roll**

**5. CONCLUSION**

**Cost Analysis**

• **Internal Production:**

- Raw Material Cost: ₹60,170
- Labour Cost: ₹14,400
- Overhead Cost: ₹2,422
- **Total Cost:** ₹76,992

• **External Purchase:**

- Raw Material Cost: ₹66,170
- Machining Cost: ₹25,481
- **Total Cost:** ₹91,651

The detailed analysis confirms that internal production offers cost advantages and better control over quality and lead time compared to outsourcing. However, a hybrid approach may be optimal, leveraging the strengths of both strategies to enhance operational efficiency and strategic alignment. This comprehensive methodology and analysis provide actionable insights for organizations navigating make-or-buy decisions in the dynamic landscape of the automobile industry. The analysis revealed that while internal production offers greater control over quality and lead times, it may incur higher costs and require significant investment in infrastructure and resources. On the other hand, external procurement options may provide cost savings and scalability but require careful supplier management and risk mitigation

**Quality Analysis**

strategies. Based on the findings of the analysis, it is recommended to consider a hybrid approach that leverages the strengths of both internal production and external procurement options. This hybrid model can optimize cost- effectiveness, quality assurance, and lead time management while mitigating risks and maximizing flexibility in the supply chain.

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