

## Production Optimization to Maximize Profit in Furniture Company PT. FurniCraft: Quantitative and Qualitative Approach

<sup>1</sup>Noni Antika Khairunnisah, <sup>2</sup>Effendy Gunardi, <sup>3</sup>Kurnadi, <sup>4</sup>Iwan Setiawan, <sup>5</sup>I Made Suparta

<sup>1234</sup>Program Doktor Ilmu Ekonomi, Universitas 17 Agustus Surabaya

<sup>5</sup>Universitas 17 Agustus Surabaya

Email: [kurnadiady1225@gmail.com](mailto:kurnadiady1225@gmail.com)

**Abstract.** This study aims to optimize the amount of production to maximize profits at the furniture company PT. FurniCraft. The method used is a quantitative approach using Linear Programming (LP) and a qualitative approach using NVivo software to analyze the results of interviews with management. The LP model is used to determine the optimal product combination that maximizes profits based on resource limitations such as raw materials, working hours, and production capacity. Meanwhile, qualitative analysis reveals non-technical factors that affect the production process, such as workforce flexibility and production policies. The results of the analysis show that by implementing an optimization model, the company can increase potential profits by up to 18.5% from actual conditions. This finding is reinforced by the results of qualitative analysis which shows that production decisions are not entirely data-based, but rather more influenced by intuition and old habits. This study recommends the integration of analytical data in strategic decision making in the manufacturing sector.

**Keywords:** *Linear Programming, Production Optimization, Nvivo, Qualitative Analysis, Furniture, Production Management.*

### INTRODUCTION

The furniture industry is an important sector in the Indonesian economy, especially in its contribution to exports and employment. However, the challenges of efficiency and accuracy of production strategies are still obstacles in achieving optimal profitability. PT. FurniCraft, as one of the medium-scale furniture industry players, faces problems in determining the ideal production volume for various types of products so as not to experience excess stock or shortage of raw materials.

This study aims to design a Linear Programming-based production optimization model to maximize company profits. In addition, a qualitative approach is used to understand the socio-organizational context that underlies the production decision-making that has been carried out so far.

### LITERATURE REVIEW

#### Linear Programming in Production Optimization

Linear Programming has long been used in decision making in the manufacturing sector, especially in

determining the allocation of limited resources for maximum results (Taha, 2017). Several studies (Misbah & Salma, 2020; Siregar et al., 2022) show that LP is able to increase production efficiency while still considering real limitations in the field such as raw materials, working time, and machine capacity.

#### 2.2. Qualitative Analysis with NVivo

NVivo is a software that makes it easy for researchers to manage and analyze qualitative data from interviews, documents, or observations (Bazeley & Jackson, 2013). In the context of production management, qualitative analysis is used to understand decisions that are not entirely rational, such as those related to work experiences, management perceptions, and informal policies.

#### Integration of Mixed Method Approach Mixed method between quantitative and qualitative (mixed-method)

Increasingly used to capture the complexity of business decision making (Creswell, 2014). In this context, the use of LP provides a quantitative foundation, while NVivo analysis strengthens the

contextual aspects that may influence such optimization.

## METHODOLOGY

### Data and Variables

Quantitative data were obtained from PT. FurniCraft's production and financial reports for the last three months. The products analyzed consisted of tables, chairs, and cabinets, with limiting variables in the form of raw material availability, machine capacity, and working hours.

### Model Linear Programming

#### Objective function:

$$\text{Maximize } Z = 100x_1 + 150x_2 + 200x_3$$

where  $x_1$  = number of tables,  $x_2$  = number of chairs,  $x_3$  = number of cupboards.

#### • Constraint:

- Wood raw materials:  $5x_1 + 3x_2 + 8x_3 \leq 1000$
- Working hours:  $2x_1 + 4x_2 + 5x_3 \leq 800$
- Production capacity:  $x_1 + x_2 + x_3 \leq 400$
- $x_1, x_2, x_3 \geq 0$

### Qualitative Analysis with NVivo

Interviews were conducted with 5 production managers and logistics staff, focusing on constraints and actual production practices. Transcripts were analyzed using NVivo to identify key themes related to production policies, work efficiency, and perceptions of technology.

## RESULTS AND DISCUSSION

### Results

#### Linear Programming Optimization

The results of the LP model show the optimal combination of production: 100 tables, 200 chairs, and 100 cabinets, which generates a profit of Rp65,000,000. This is 18.5% higher than the actual profit realization of Rp54,850,000.

### Qualitative Findings

NVivo analysis identified three main themes:

- 1) Informal production policies - decisions are often based on experience, not data.
- 2) Limited coordination between divisions - leads to waste of resources.

- 3) Perception of technology - most staff felt LP was too complex and impractical.

### Practical Implications

The findings show the importance of a data-driven approach to decision making. Training and involvement of management in the analysis process are key to successful implementation of optimization models.

## CONCLUSION

This study shows that the production optimization approach with Linear Programming can significantly increase company profits. On the other hand, the qualitative approach reveals social and structural factors that need to be considered in its implementation. The combination of the two approaches provides more comprehensive results for production decision making in manufacturing companies.

### Recommendation

PT. FurniCraft is advised to start integrating production data and analytics in decision making and conduct regular training to improve management technology literacy.

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