

## MEMORANDUM

**To:** Filatoi Riuniti

**From:** Group N

**Date:** December 3, 2023

**Re:** Production Analysis

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### EXECUTIVE SUMMARY

Filatoi Riuniti, a longstanding family-owned spinning mill in Piemonte, Italy, faces significant challenges in the evolving global textile market. After a period of aggressive expansion, the company is grappling with financial difficulties due to economic recession and a strong Italian lira. Rigid labor laws and intense international competition, notably from East Asia, further complicate the situation. To address these issues, Filatoi Riuniti has outsourced a portion of its production, but this has led to complex management of costs and efficiency. The company now seeks to optimize its operational strategies, focusing on production costs, machine capacity, and effective outsourcing to navigate these challenges and maintain its competitive edge. Our group worked through the data given to optimize the process and cost suggesting the mills to outsource.

### STATEMENT OF THE PROBLEM

Filatoi Riuniti's current challenges stem from financial strains. The company's rigid labor environment and the inability to swiftly adjust its workforce in response to fluctuating market demands add to its problems. Additionally, the need for rapid production turnaround in the fashion industry have led Filatoi Riuniti to outsource part of its spinning production. This solution, however, has introduced complexities in cost management and production optimization, necessitating a strategic reassessment of the company's operational approach. Our approach to work on it is described below.

### METHODOLOGY

We used the excel solver to analyze this issue which is a tool for solving linear programming and nonlinear optimization problems. The following are the steps we followed:

- Decision Variables Identification: Recognize the variables that will be adjusted to find the optimum solution, such as the quantity of product bought from each supplier.
- Objective Function Establishment: Set up an objective function to minimize, which in this case is the total cost that combines both production and transportation expenses.
- Data Input: Populate the model with necessary data, including costs of production and transportation, machine hours required, and production capacity.
- Constraints Formulation: Apply constraints to the model to encapsulate the production limits, such as machine capacity and production minimums and maximums.
- Solver Configuration: In Excel Solver, configure the objective (minimizing total costs) to be achieved by altering the decision variables, within the bounds of the established constraints.
- Solver Execution: Run the Solver to find the best solution that minimizes the cost while adhering to all constraints.
- Results Evaluation: Examine the Solver's output to ensure practical applicability and make adjustments to the model if necessary.
- Sensitivity Analysis: Perform sensitivity analysis to understand the impact of changes in the input data on the optimal solution.
- Documentation: Document the process and results, along with any sensitivity analysis, for transparency and stakeholder communication.

## RECOMMENDATIONS

Using the above model described, we analyzed different questions and here are the recommendations we had:

- The optimal outsourcing plan for Filatoi Ruiniti resulted in the minimal cost of \$1382544.33.
- To achieve the optimal cost, Filatoi Riuniti outsourced production of various yarns, including 6,250 kg of fine yarn to Ambrosi, 4,286 kg of extrafine yarn to Bresciani, 3,704 kg of extrafine to Castri, 2,040 kg of medium yarn to De Blasi, 3,846 kg of extrafine yarn to Estensi, and 7,143 kg of medium yarn to Giulian and in-house production included 13,164 kg of extrafine yarn, 19,750 kg of fine yarn, 18,817 kg of medium yarn, and 28,000 kg of coarse yarn.
- The scenarios with different factors and approaches are presented in the excel with all the formulas and results, giving our recommendations.