

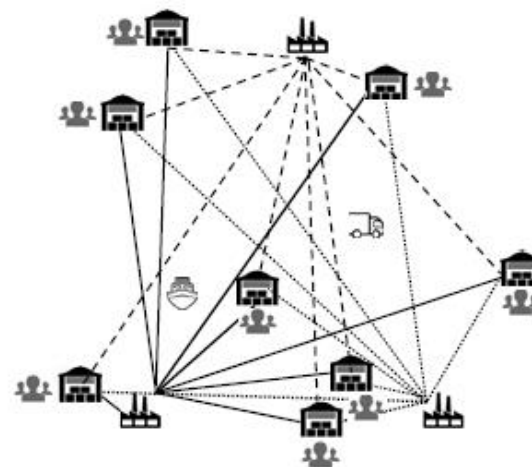
Case

Production and Distribution

Optimization at Marinero

Company Profile

- Marinero is a leading producer and seller of **5 high-quality beach equipment** in Italy.
- Marinero produces its products in several manufacturing plants and sells them via sales centers to **two main independent markets**: private customers and business clients.
- The company has **3 production plants** and **8 sales centers** strategically located across Italy.



Products



- Demand and price for each product from each market are given.
! *Disregard section 2.1. in the Case Description file*

Production plants

- **Production plants have no warehouse**; all the produced items must be sent to the sales centers.
- Activating production in a plant requires fixed cost, which does not depend on the number of items produced.
- Transportation cost between a production plant to a sales center depends on the distance between the two facilities and the volume of products shipped.

Product type	Unit volume (m ³)
deckchair	0.6
beach umbrella	0.3
sun bed	0.8
director's chair	0.4
frisbee	0.01

! Disregard subsections 2.2.3. and 2.2.4. in the Case Description file

Manpower at Production Plants

- Manufacturing one product unit in a plant may require a different level of manhour resources than producing the same product unit in another plant.
- Manpower costs are due to a monthly salary given the number of hired workers.
- Each plant decides the number of workers to be hired each month:
 - the number of hired workers may vary from month to month in the same plant,
 - the number of hired workers must be in a given interval between a lower and an upper limit.
- If a plant is closed, it cannot hire any workers.

Sales Centers

- Each sales center can sell products to different types of customers each month.
- Monthly demand and the price of each product from different customers are given.
 - Demand for each market does not need to be fully satisfied.
- **A sales center has a warehouse** that can be used to store unsold products and later sell them during the following months.
 - There is no stock at the beginning of the semester.
 - Inventory holding cost depends on the type of product and in which sales center the product is stored.

Activating a Sales Center

- Activating a sales center requires a fixed cost, which does not depend on the number of items sold.
 - If a sales center receives even one unit or a product in a single month, it must pay a fixed cost.
- For commercial reasons, **only seven out of eight possible sales centers can be opened.**

! *Disregard sections 2.4. and 2.5. in the Case Description file*

Operations Strategy

- Ground-rule approach based on managers' expertise.
- Concerns:
 - The production and distribution process becomes more and more complex.
 - Select a new decision support model to identify a competitive strategy for the next season.
- Plans:
 - Develop a feasible solution for the **production and distribution planning** for **a six-month period**.
 - Maximize the overall profit of the company.

Required Analysis

- You are asked to propose a new strategy for **production and distribution planning** at Marinero that **maximizes its profit** that is the difference between **total revenue and total cost**.
- The total cost will include:
 - the activation costs of the facilities,
 - production and distribution costs,
 - inventory holding costs,
 - labor costs.

Expected Output

! This part replaces Section 3. – 5. of the Case Description File

Prepare a written report (max 5 pages) that contains the following sections:

- **Section 1.** A complete mathematical model that you used to determine the optimal production and distribution planning, with the definition of sets, parameters, and decision variables. Do not forget to explain your model.
Remark: use LaTeX or the Equations editor of Ms. Word to write your model (no “symbol”!)
- **Section 2.** Summary of your results and managerial advice (max 2 pages, including figures and charts). Your analysis should be based on quantitative results.

A complete AIMMS folder is expected to contain:

- All the AIMMS files,
- Excel file that is used to import the data.

Remark: your AIMMS model should be understandable (use, when possible, the same variable and parameter names in the report and in the AIMMS files; utilize the “comment” fields in AIMMS).

Important Dates

CHOOSE YOUR GROUP:

Four students max, on Lol@ for Friday, 17 Mar, 17:59

REPORT SUBMISSION:

One folder (in zip) containing the report & AIMMS folder.

Friday, 5 May, until 23:59

Reference:

Andrea Manno, Laura Palagi, and Simone Sagratella. Case—production and distribution optimization of beach equipment for the marinero company. INFORMS Transactions on Education, 19(3):155–159, 2019.