Café Expansion Decisions

1 Introduction

You are working as a business analyst for a popular café chain that is planning to expand its operations. Your manager has asked you to design a Monte Carlo simulation model to evaluate different expansion strategies and determine the optimal one. You need to consider factors such as location, estimated revenue, initial investment, and operating costs.

2 Objective

The objective of this assignment is to use Monte Carlo simulation to assess the risks and rewards associated with various expansion strategies for the café chain. You will evaluate the performance of different strategies and determine the best one based on net present value (NPV), payback period, and return on investment (ROI).

3 Data

You have been provided with the following data:

1. A list of potential locations, each with the following information:
   (a) Estimated initial investment (construction, equipment, etc.)
   (b) Estimated monthly operating costs (rent, utilities, wages, etc.)
   (c) Estimated monthly foot traffic (number of potential customers)
   (d) Estimated average spend per customer
2. The café chain's required rate of return (discount rate)
3. The company's target payback period

4 Probability Distributions

The following probability distributions will be used to model the uncertainty in the data:

1. Initial investment: Triangular distribution with min, max, and most likely values provided for each location
2. Monthly operating costs: Normal distribution with mean and standard deviation provided for each location
3. Monthly foot traffic: Poisson distribution with mean provided for each location
4. Average spend per customer: Lognormal distribution with mean and standard deviation provided for each location

A list of potential locations and data parameters are listed in the Excel file.

5 Tasks

1. Familiarize yourself with the provided data and probability distributions.
2. Create a Monte Carlo simulation model for each potential location, considering the provided data and probability distributions. Calculate the monthly revenue and net cash flow for each location.
3. Calculate the Net Present Value (NPV) for each location using the café chain's required rate of return.
4. Determine the payback period for each location based on the cumulative net cash flow.
5. Calculate the Return on Investment (ROI) for each location after the target payback period of 3 years.
6. Analyze the results of your simulations, considering NPV (discount rate 0.1). Identify the optimal location for expansion based on your analysis.
7. Discuss the risks and uncertainties associated with the optimal location and any potential mitigation strategies.
8. Prepare a report summarizing your findings and present your recommendations to the management team.