EXERCISE 3. RISK POOLING GAME

The present exercise deals with one of the most important concepts in Supply Chain, Risk Pooling. The Risk Pooling Game shows behavior of risk pooling under different demand scenarios and different inventory management systems.

To set up the Risk Pooling Game please run the setup file and install the software. Note that before playing each round of the game, you will need to initialize the game. Resetting will not initialize the game and you will need to exit the game each time before commencing a new round.

Please answer the questions provided below. In your practical report do not forget to critically comment all your answers based on the theoretical classes.

a) Considering the broad topic of risk pooling, do a brief literature review (300 words approximately). You can search different scientific approaches to the problem, as well as the main supply challenges, advantages and disadvantages associated with taking advantage of risk pooling. Insert your search in the "Methodology section" of your report.

For the following answer assume the default values that are displayed in the screen, as well as the costs structure.

b) Run the game for 30 weeks knowing that the average demand is 25 units and the standard deviation is equal to 10 units. Record the profit values for the centralized and the decentralized supply chains for every week (from week 6 to week 30 the values are already recorded). Plot the profit VS the number of weeks for centralized and decentralized supply chain (use the same plot for both supply chains). What can be concluded from the analysis of this plot?

c) How can you explain the decrease of profit in some weeks?

- Plot demand profile VS the number of weeks for 30 weeks. On the menu bar go to *Reports -> Demands* and take the demand profile for the three retailers.

d) Evaluate how profit varies under different demand conditions in different markets (see Figure 1). Compare the results obtained in each of the conditions given in table 1 through the analysis of the resulting plots.
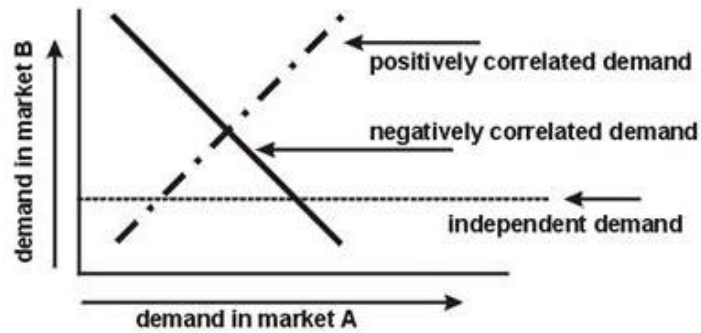
Figure 1: Demand correlation across markets

Table 1: Demand Senarios

Run no.	Demand Correlation	Mean demand	Standard Deviation of demand
1	Strongly Positive	25	10
2	Strongly Positive	25	15
3	Strongly Positive	25	5
4	Independent	25	10
5	Independent	25	15
6	Independent	25	5
7	Strongly Negative	25	10
8	Strongly Negative	25	15
9	Strongly Negative	25	5

- On the menu bar go to *Play -> Option -> Demand*. The random demand parameter dialog box will appear. Play the game with the conditions described in the following table (Table 1).

- Profit data should be recorded for 30 weeks (weeks 3-30 are already filled out for you) for each run (1-9).

- Plot the last chart that compares all demand profiles with a standard deviation of 10 (point 4 in the excel file).

e) What are the trade-offs that need to be considered in comparing centralized and decentralized systems?

f) Give some examples of decisions such as warehouse location and flows; transportation; supply chain integration strategies; and product design, that could be affected by risk pooling.

g) What other variables could be inserted in the game to study the impact of risk pooling in the supply chain?