CAPSTONE RESEARCH

Bulk food recall decisions: Postponement and preponement to sustain food business

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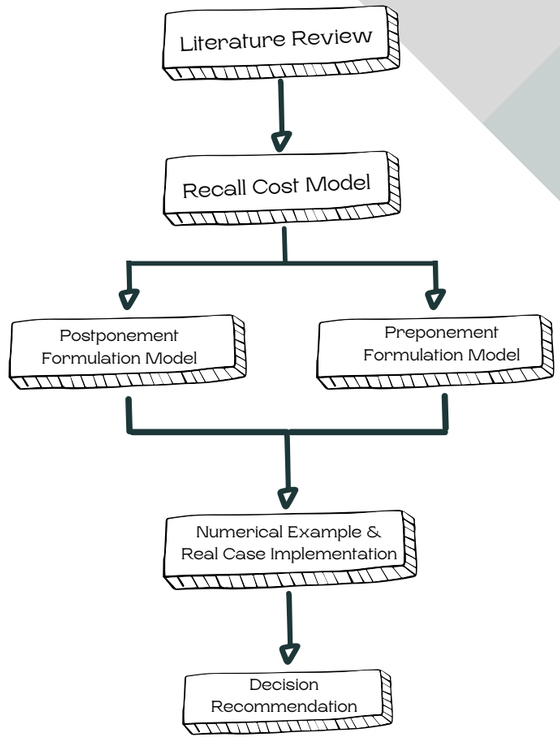
1. Background

Bulk food without packaging is prone to contamination which requires the recall of the food. Oil industry companies need to implement effective decisions to prevent huge losses and costs.

2. Objectives

This study aims to determine the most effective disposition timing to reduce such recall costs and to ensure that business remains sustainable

3. Framework



4. Models

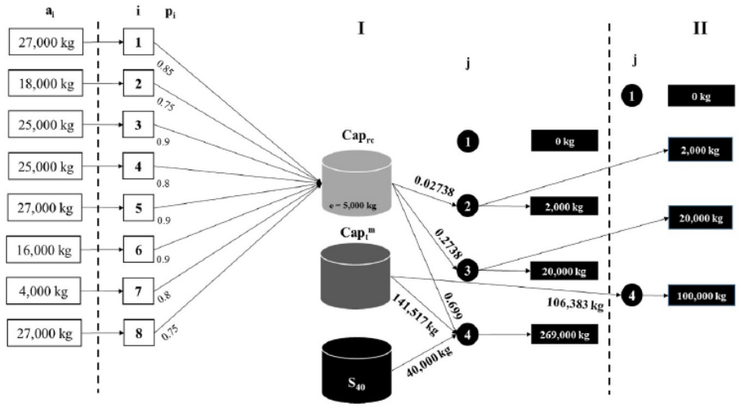
Postponement Model Formulation :

$$Min\ RC = \sum_{i=1}^{I} tr_{fi} + \sum_{i=1}^{I} tr_{if} + \sum_{i=1}^{I} in_i + \sum_{t=1}^{T}\sum_{t'\geq t}^{T'} M_{tt'}(P_m + pr) + \sum_{t=1}^{T} \times \sum_{t'\geq t}^{T'} M_{tt'}(t-1)H_f + s_{40}/\gamma_{41}(P_m + pr) + eP_e + s_{4T'}M + \sum_{j=1}^{4} c_j$$

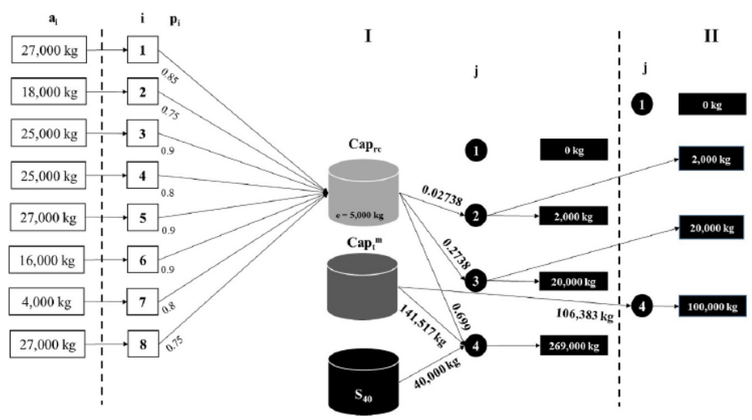
Preponement Model Formulation :

$$Min\ RC = \sum_{i=1}^{I} tr_{fi} + \sum_{i=1}^{I} in_i + \sum_{t=1}^{I}\sum_{t'\geq t}^{I} M_{tt'}(P_m + pr) + \sum_{t=1}^{I}\sum_{t'\geq t}^{I} M_{tt'}(t-1)H_f + s_{40}/\gamma_{41}(P_m + pr) + eP_e + \sum_{t'=1}^{I} r_{31t'}e(t'-1)H_j + \sum_{t=1}^{T}\sum_{t'\geq t}^{T'} r_{4tt'}epr + \sum_{t=1}^{T}\sum_{t'\geq t}^{T'} r_{4tt'}e(1-t)H_f + \sum_{t=1}^{T}\sum_{t'\geq t}^{T'} r_{4tt'}e\gamma_{4t}(t'-t)H_f + s_{3T'}M + s_{4T'}M + \sum_{j=1}^{4} c_j$$

Postponement Model Optimal Solution :



Preponement Model Optimal Solution :



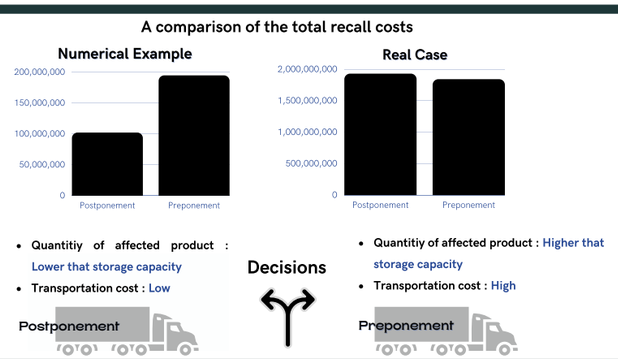
5. Results

Numerical Examples

After determining the optimal retail price based on two different intervals of reman price in the demand function, a restriction on the reman price is found based on the manufacturer's initial released wholesale price and the customer's maximum willingness to pay.

Real Case

This study uses a real recall case from the edible oil industry in Indonesia in 2014. A customer's complaint regarding the out-ofspecification color of coconut cooking oil (RBDCNO) resulted in a product recall.



6. Conclusions

The results of the numerical example show that the postponement model produces lower recall costs than the preponement model. However, the preponement model resulted in a lower recall cost when a sensitivity analysis was carried out by significantly increasing transportation costs.

In the real case the two disposition timing models were processed using Lingo 11. Preponement is better in this case because the product was distributed overseas with high transportation costs. These results provide an insight for decision makers in the edible oil industry when deciding on a trade recall.

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