



SELECTION OF A MODE OF TRANSPORT FOR MANUFACTURED GOODS

FIP-1

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Dilemma: Selecting a mode of transportation with cost reducing benefits without degrading the quality of the products or the delivery time

1 - ABSTRACT

- Fictitious company based in Colombes specializes in the export of electronic cards for automotive sector
- Import of cards from Japan and export in all Europe to Luton (UK), Valladolid (ES), Bruxelles (BE), Neckarsulm (GE)
- Electronic cards :
 - Cost: 40€/card
 - Storage: 1 container → 20 palettes → 20 packages → 20 cards

2 - MODEL DESCRIPTION

- Export to Neckarsulm using Incoterms® 2010 DAP - Neckarsulm
- 4 alternatives:



Barge

Distance : 700km
Delivery time: 7d

Cost: 126€



Train

Distance: 700km
Delivery time: 3d

Cost: 468,5€

- Decisional parameters :
 - Cost
 - Delivery Delay



Truck

Distance: 623km
Delivery time : 0,85d

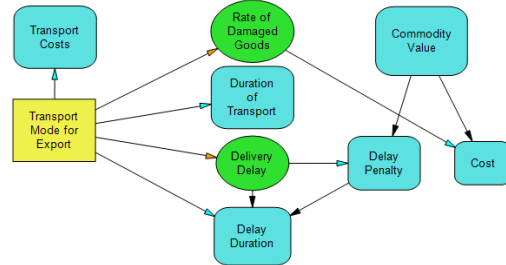


Plane

Distance: ≈700km
Delivery time: 2d

Cost: 3248,6€

3 - INFLUENCE DIAGRAM



4 - DECISION TREE

- Attribute functions:

- Delay

$$u1(x) = -0.7841 + 1.7841 e^{-\frac{\text{del.ats}}{12.163036}}$$

- Cost

$$u2(x) = -0.2342 + 1.8700 e^{-\frac{\text{costs}}{9626.147285}}$$

- Multi-attributes functions

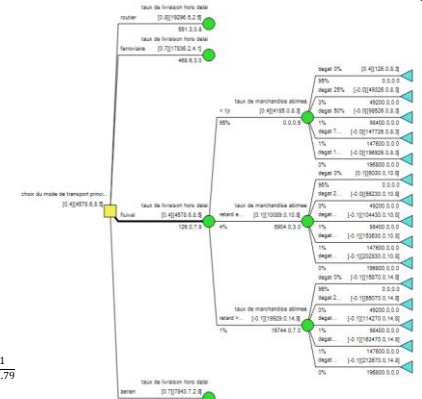
- Coefficients

$$k1=0.25 \quad k2=0.19 \quad K=11.79$$

- Functions

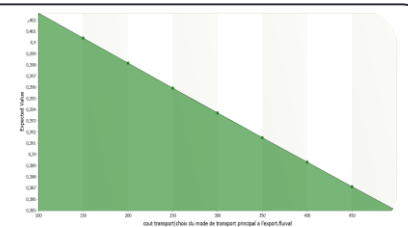
$$U(x) = \left((1 + K \cdot k1 \cdot u1(x)) \cdot (1 + K \cdot k2 \cdot u2(x)) - 1 \right) \cdot \left(\frac{1}{K} \right)$$

$$U(x) = \left(\left(1 + 11.79 \cdot 0.25 \cdot \left(-0.7841 + 1.7841 \cdot e^{-\frac{\text{del.ats}}{12.163036}} \right) \right) \cdot \left(1 + 11.79 \cdot 0.19 \cdot \left(-0.2342 + 1.8700 \cdot e^{-\frac{\text{costs}}{9626.147285}} \right) \right) - 1 \right) \cdot \frac{1}{11.79}$$



5 - SENSITIVITY ANALYSIS

- Augmentation of fluvial costs:
 - Variation of tolls taxes
 - Variation of petrol price
- Variation between 100€ and 500€
- Fluvial remains the best solution



RESULTS



FLUVIAL TRANSPORTATION

Best costs, best liability in delay and quality in accordance with our decisional parameters
 Cost: 4578,6€ Delivery time: 8,5 days Mean delay: 0,7 day



CONCLUSIONS

The results of the studies gives the fluvial solution as the best mode of transportation, however considering the number of hypotheses the conclusions must be interpreted with a broad point of view. By adding new parameters to the model such as the possibility to use different Incoterms®2010 or the consideration of specific insurances for each mode of transportation, the end result of the study will be more accurate and close to the reality of the logistic in the industry world.