PRICE MODELLING on HEAVY-DUTY ASSISTANCE CONTRACTS

Modelling, Simulation and Optimization of Assistance Contracts Cost's

H2020 SOCIETAL CHALLENGES: Smart, Green and Integrated Transport

PRODUCTIVE SECTOR: Logistics and Transport

PROBLEM DESCRIPTION

Nors group is a Portuguese group whose vision is to be one of the world leaders in transport solutions and construction equipment.

Given the high number of service contracts, the group needs an efficient way to analyze the existing data and to estimate the global cost of the assistance contracts, in order to minimize their risks.

CHALLENGES AND GOALS

- To evaluate the risk and price model that was implemented in the company.
- To construct a model that estimates the final cost of a contract.
- To guarantee a complete cost control through a fixed monthly fee.
- To implement the model through Graphic User Interface.

MATHEMATICAL AND COMPUTATIONAL METHODS

The developed methodology is based on probabilistic modelling of accumulated repair and maintenance costs. The probability density functions are chosen from a given set of known distributions or using kernel density estimators based on the minimization of the global error criteria.

Monte Carlo methods were used to simulate the total costs, based on the distributions of the random variables that represent the maintenance and the repair costs.

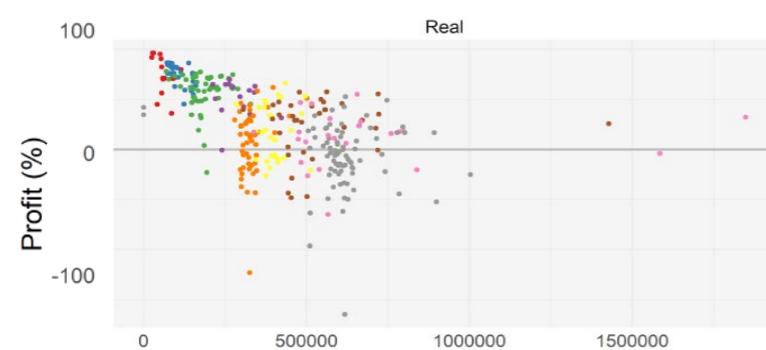

Graphic User Interface developed

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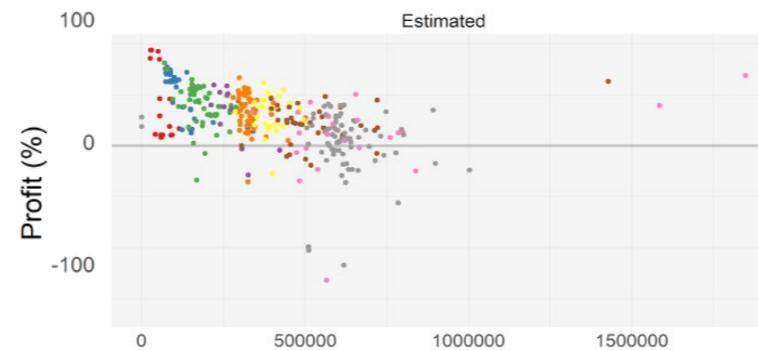*Modelling, Simulation and Optimization of Assistance Contracts Cost's*

Results and Benefits

Contracts with a longer lifespan and more kilometers travelled tend to generate smaller profit margin and may even generate losses. Those contracts have much more variance on the cost's random variable, increasing significantly the company risk.

The developed mathematical model, materialized on a GUI, allows the business manager to estimate contract price proposals according to the model presented and to compare it with the ones that were previously settled by the company. The data processing also validates the parameters used to generate the assistance contracts quotations, checking their adherence with the company real costs. .
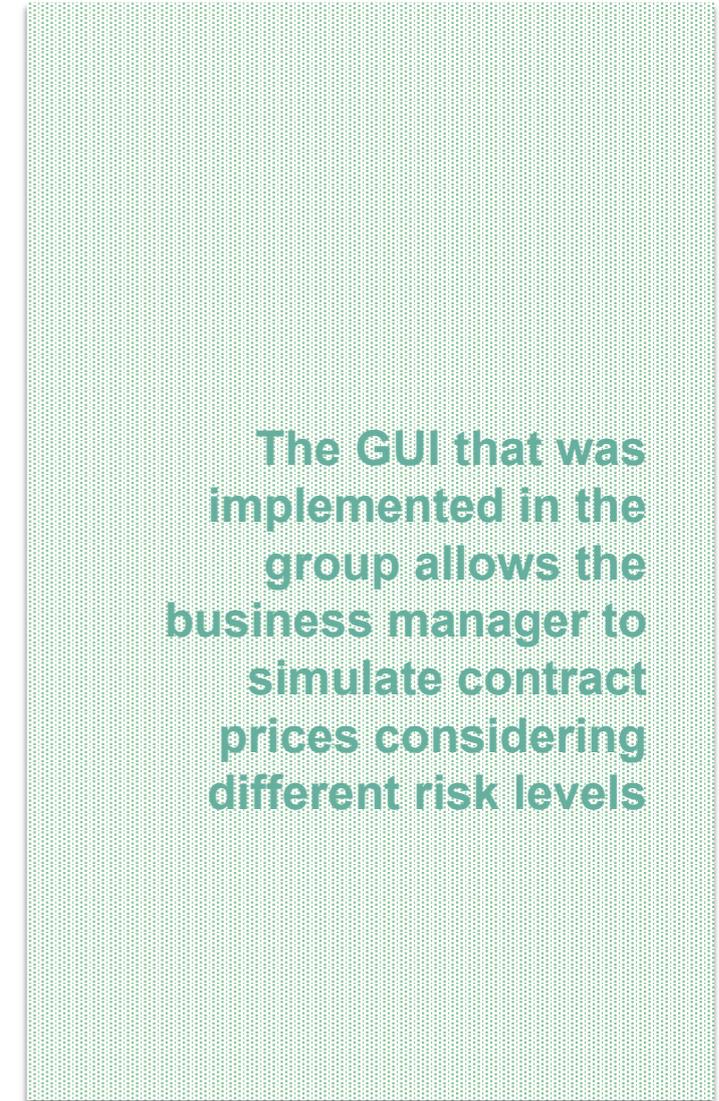
The GUI that was implemented in the group allows the business manager to simulate contract prices considering different risk levels

Real profit margins of a Nors Company versus mileage

Estimated profit margins of a Nors Company versus mileage

Digital Twin

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