OPTIMIZING AN AUTOMOTIVE WHOLESALER'S STOCK MANAGEMENT

Modelling, Simulating and Optimizing the stock of a spare parts wholesaler

H2020 SOCIETAL CHALLENGES: Climate Action, Environment, Resource Efficiency and Raw Materials

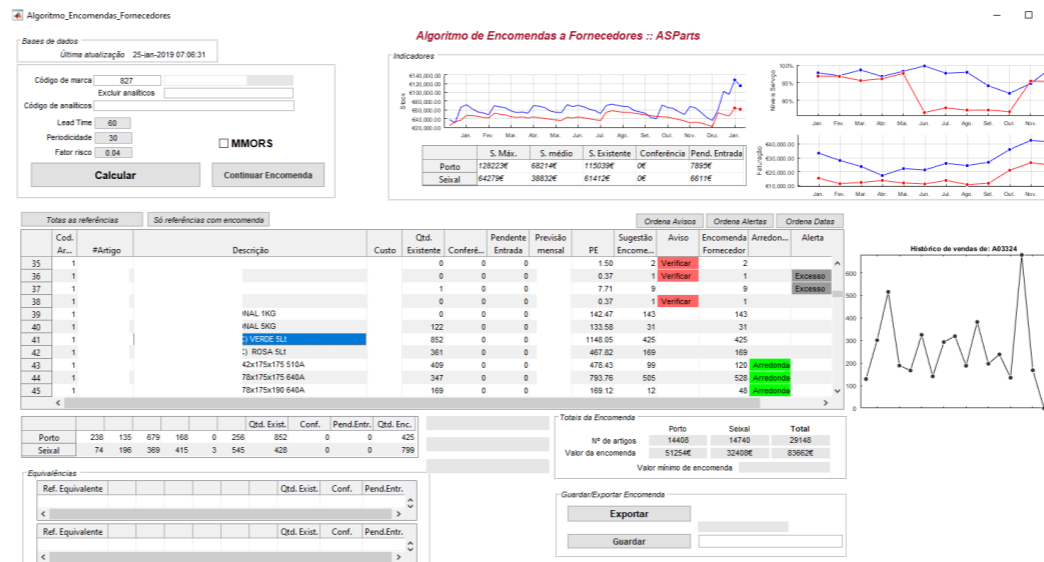PRODUCTIVE SECTOR: Service Management

PROBLEM DESCRIPTION

Nors is one of the largest Portuguese groups in the automotive sector, acting worldwide. With around 8 M€ in stock, around 200K parts numbers, and more than 120 suppliers with different logistic setups, a company from the Nors group needed a efficient way to manage its order system, regarding its spare part business.

CHALLENGES AND GOALS

- To guarantee an excellent service level.
- To reduce logistic costs.
- To optimize the return of available budget.
- To implement the model as an external layer to the existing ERP.

MATHEMATICAL AND COMPUTATIONAL METHODS

In 2013, the Engineering Mathematical Lab (LEMA) from Oporto School of Engineering (ISEP-IPP) was challenged to develop a tailor-made mathematical tool to control the stock management in the companies of NORS group that operate on the aftermarket sector. To do so, firstly were defined which were the best metrics to meet the managers goals. Afterwards, data analysis techniques were applied to detect which type of patterns were present on sales. With this information, an automatic forecasting model with several prediction methods was built. Simulating different scenarios, the forecasting model was then tuned. Finally, to take advantage of the group sales volume, an optimization model (MMORS) was implemented in order to minimize logistical costs.


MMORS front-end.

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Results and Benefits

One year after MMORS fully implementation, the Mean Daily Stock was reduced around 18%, while the Service level was increased around 1% . All of those in a year where the gross sales were increased by 9%. All the model was implemented in a tailor made software that, although being nowadays the core of the company ordering system, didn't imply any major changes on their existing ERP.
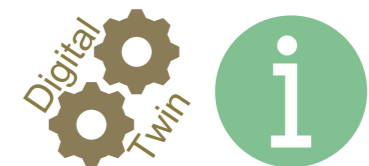
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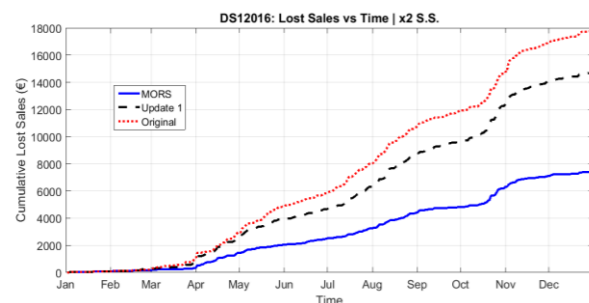
MMors (blue) vs Original (red) cumulative lost sales value for a given family of spare parts
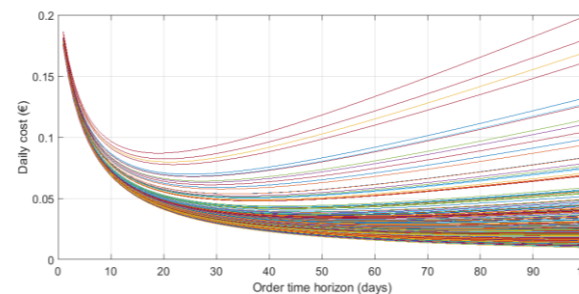
Daily cost vs order time horizon for a set of spare parts

Digital Twin