

Automation of Warehouse Decision Making

Motivation / Background



Warehouses across the world have many different variables that make each one unique.



Previous models do not work for all warehouses. There is no universal solution.



Human error affects productivity and can lead to delays.



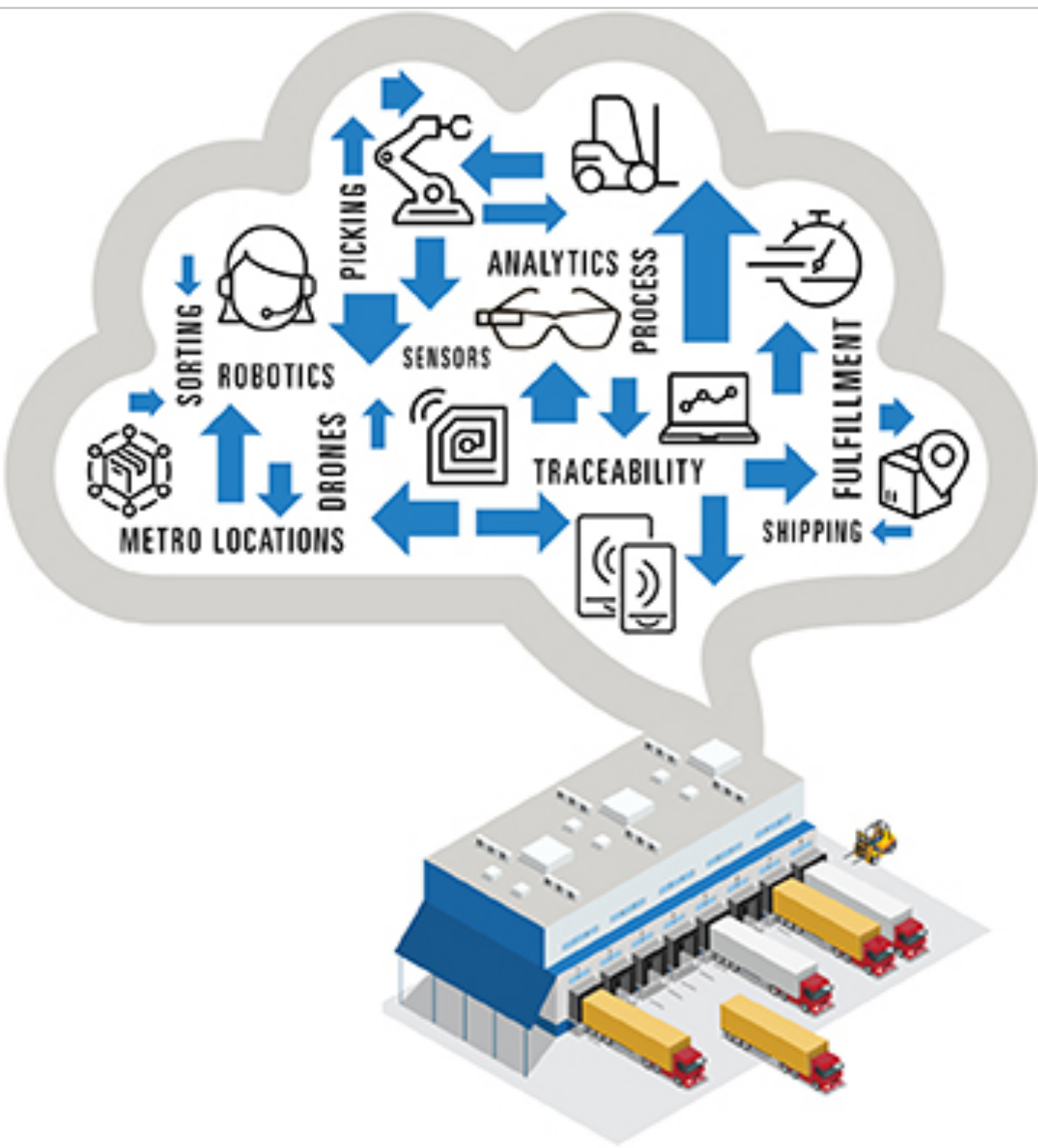
Improving the decision making will help the company save money and increase service level.

Key Question / Hypothesis

- > What is the impact of a bad decision when compared to a good one
- > By altering different variables within the warehouse a best overall solution can be found.

Relevant Literature

- > Karmaker, C. L., & Saha, M. (2015). Optimization of warehouse location through fuzzy multi-criteria decision making methods. Decision Science Letters, 315–334. <https://doi.org/10.5267/j.dsl.2015.4.005>
- > Altioik, T., & Melamed, B. (2007). Simulation Modeling and Analysis with ARENA. Academic Press © 2007
- > Correll, D., Suzuki, Y., & Martens, B. J. (2014). Logistical supply chain design for bioeconomy applications. Biomass and Bioenergy, 66, 60–69. <https://doi.org/10.1016/j.biombioe.2014.03.036>

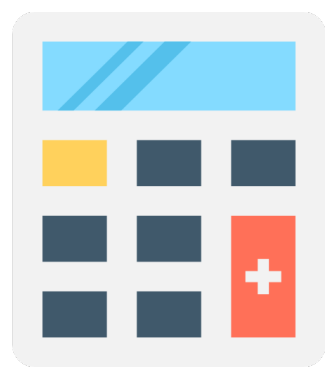


Srouce: Kroll (2019)

The Problem



Human error makes the company fall behind schedule and decreases productivity.



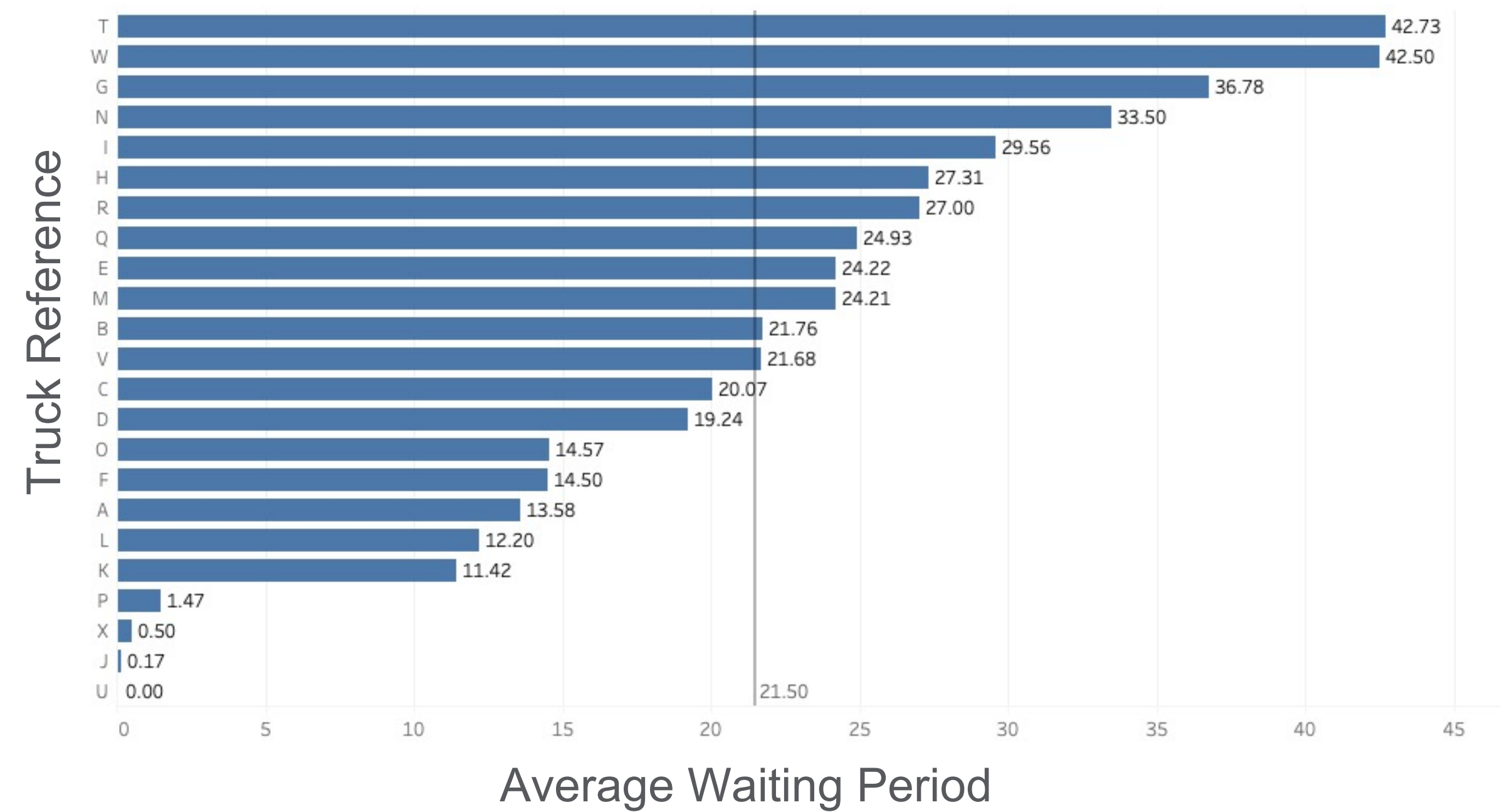
Delivering late impacts service level and increases fees that have to be paid to carriers and customers

Methodology

Discrete Events Simulation Model	+	Metaheuristic on OPT in Arena
Problem Formulation		Non-linear NP hard problem.
Model Conceptualization		No function to find the global result.
Model Translation & Validation		Use Metaheuristic to solve, but time consuming
Model Runs & Data Collection		Arena OptQuest could find the optimal condition.
Data Analysis		Use KPIs to evaluate the result.

Initial Results

Average Waiting Period Per Truck Reference



Expected Contribution

- > A discrete-event simulation model in order to analyze the different outcomes of decisions made within different instances.
- > An overall best solution for all the different possible scenarios.

Future Studies

- > Continue the automation of other decisions within a warehouse.
- > Combine all the different models and analyze what the final result will be.

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