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Sponsor: Johnson & Johnson

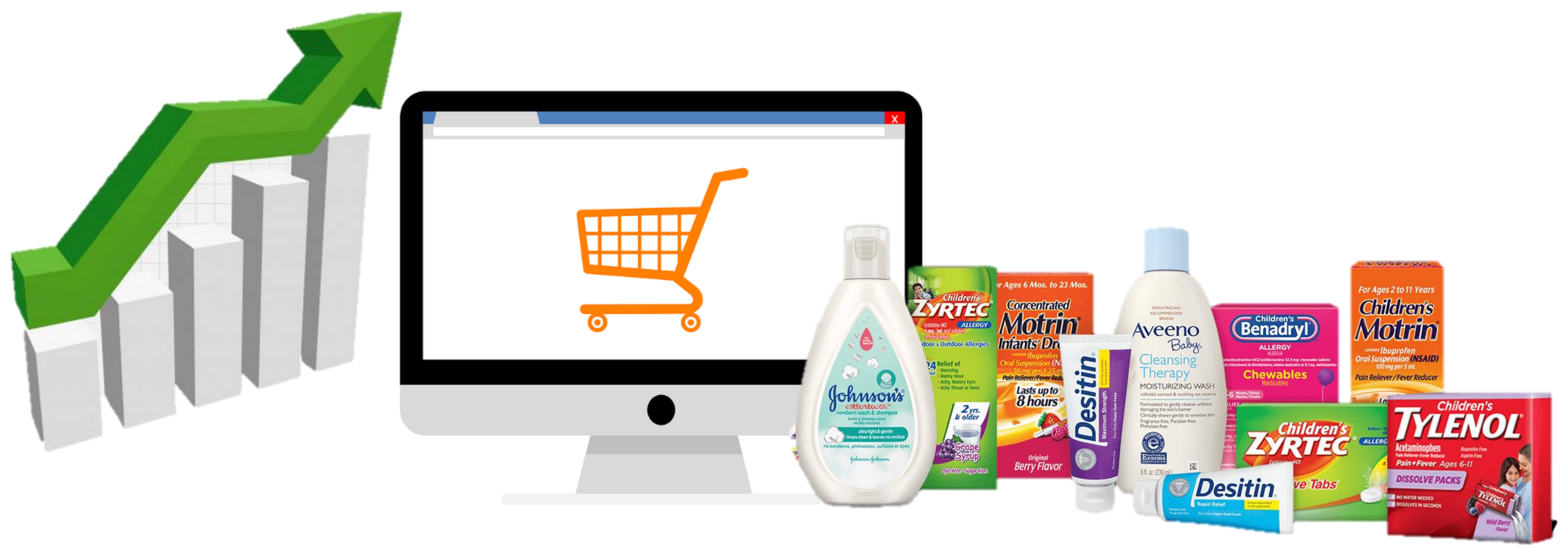
E-volving the Supply Chain: Optimizing Digital Shelf Availability

MIT GLOBAL SCALE NETWORK

May 2021 Poster Session

Motivation / Background

- Have seen 35-40% e-commerce growth YoY, with the unprecedented 85% growth in 2020
- Unpredicted stockout events affect overall customer satisfaction, increase chargebacks, and risk losing online search priority.



USD 3.6 Bn In Sales | E-commerce growth | 350,000 SKUs

Key Question / Hypothesis

- What are the reasons for out of stock on ecommerce?
- How to improve ecommerce fill rates with machine learning algorithms?

Relevant Literature

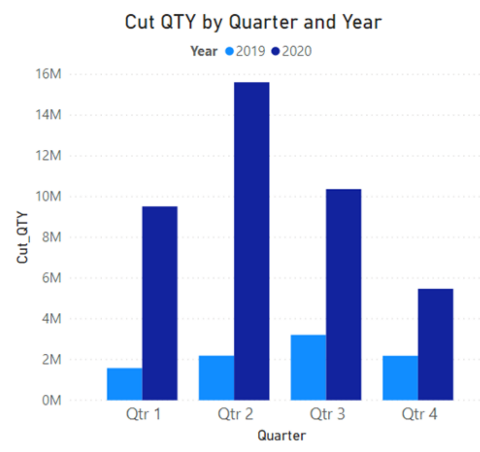
- Agatz et al. - 2008 - E-fulfillment and multi-channel distribution – A r.pdf
- Milićević, N., Grubor, A., Đokić, N., & Avlijaš, G. (2018). Retail Out-of-stocks in the Context of Centralized and Direct Delivery. Promet - Traffic&Transportation, 30(1), 105–114. https://doi.org/10.7307/ptt.v30i1.2466
- Usman, K. (2008). Determination of drivers of stockout performance of retail stores using data mining techniques [Thesis, Massachusetts Institute of Technology]. https://dspace.mit.edu/handle/1721.1/45246

Methodology

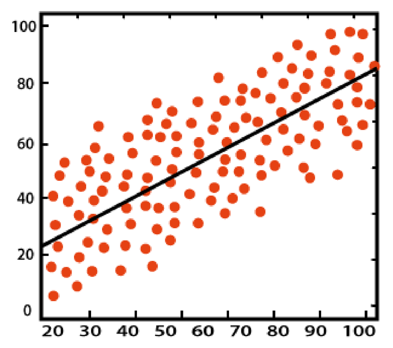
Interview

Data Collection

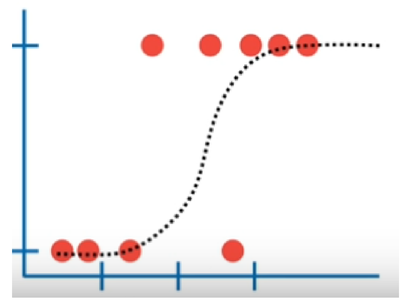
Descriptive Statistics



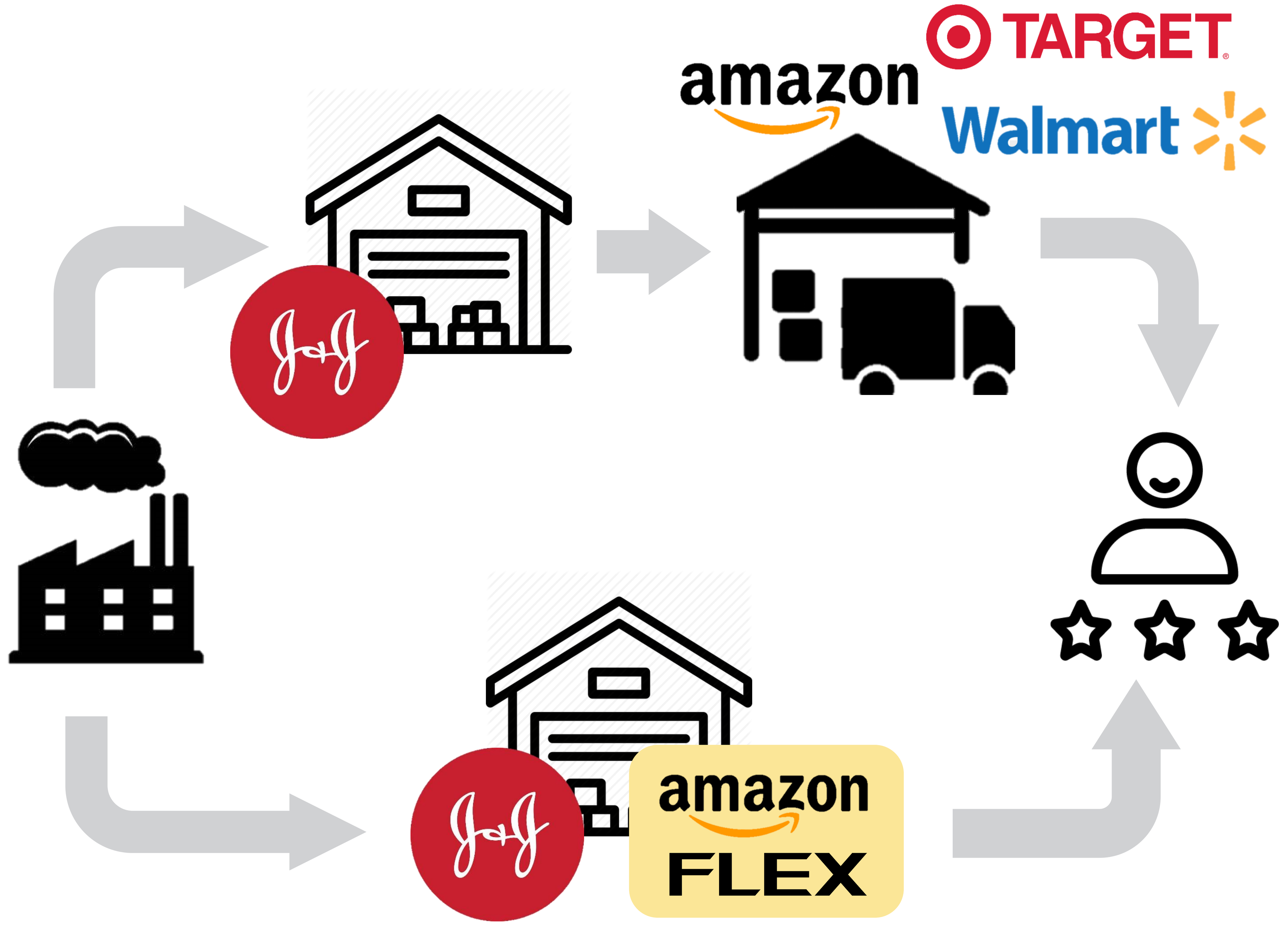
Multiple Linear Regression



Logistic Regression



J&J's E-commerce Flow



Managerial Insights

- Variables related to demand, including order quantity and order size, have bigger impact on stockouts than supply variables, like inventory.
- Brands and product categories play an important role in stockout prediction.

Rebecca Chao

Federico dos Santos