



Designing a closed-loop supply chain on MIT's campus

Motivation / Background

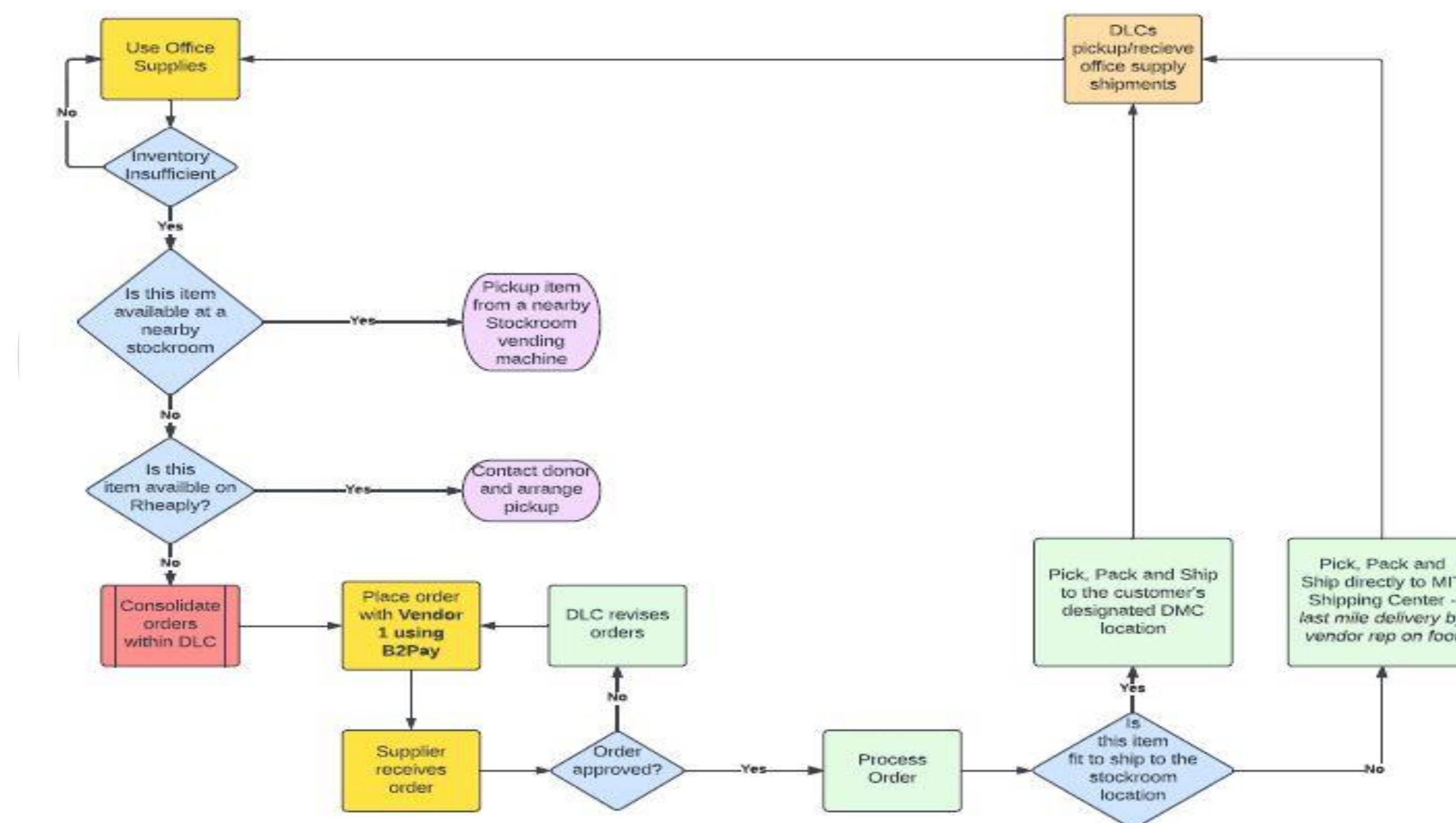
- Building on the success of the centralized procurement process for protective personnel equipment (PPE) and cleaning supplies, this capstone dives deep into exploring the feasibility of a consolidated office supplies procurement process and options for take-back schemes in the form of reverse logistics in order to support the MIT Climate Action Plan of net zero carbon emission by 2026.
- We wanted to build a sustainable solution keeping in mind the DLC user at the center of it.
- Our biggest motivation is to create a framework that unites the forward and reverse logistics flow of material and brings them as close as possible to each other operationally – A solution that is user friendly and encourages stakeholder's participation.

Key Question / Hypothesis

- What does the current purchasing process look like at different labs, departments and centers at MIT?
- What are some of the key pain points of the associated stakeholders about the procurement process?
- What actions are DLC stakeholders willing to take to participate in the proposed stockroom model?

Relevant Literature

- Hewlett Packard, Sustainable Impact Report (2020)
- Hewlett Packard, Planet Partners - Supplies recycling program
- Sorel, K., & Gao, S. (2021). MIT Campus PPE Demand Planning
- Massachusetts Institute of Technology, About MIT (2022)
- Massachusetts Institute of Technology, Department of Facilities (2022)



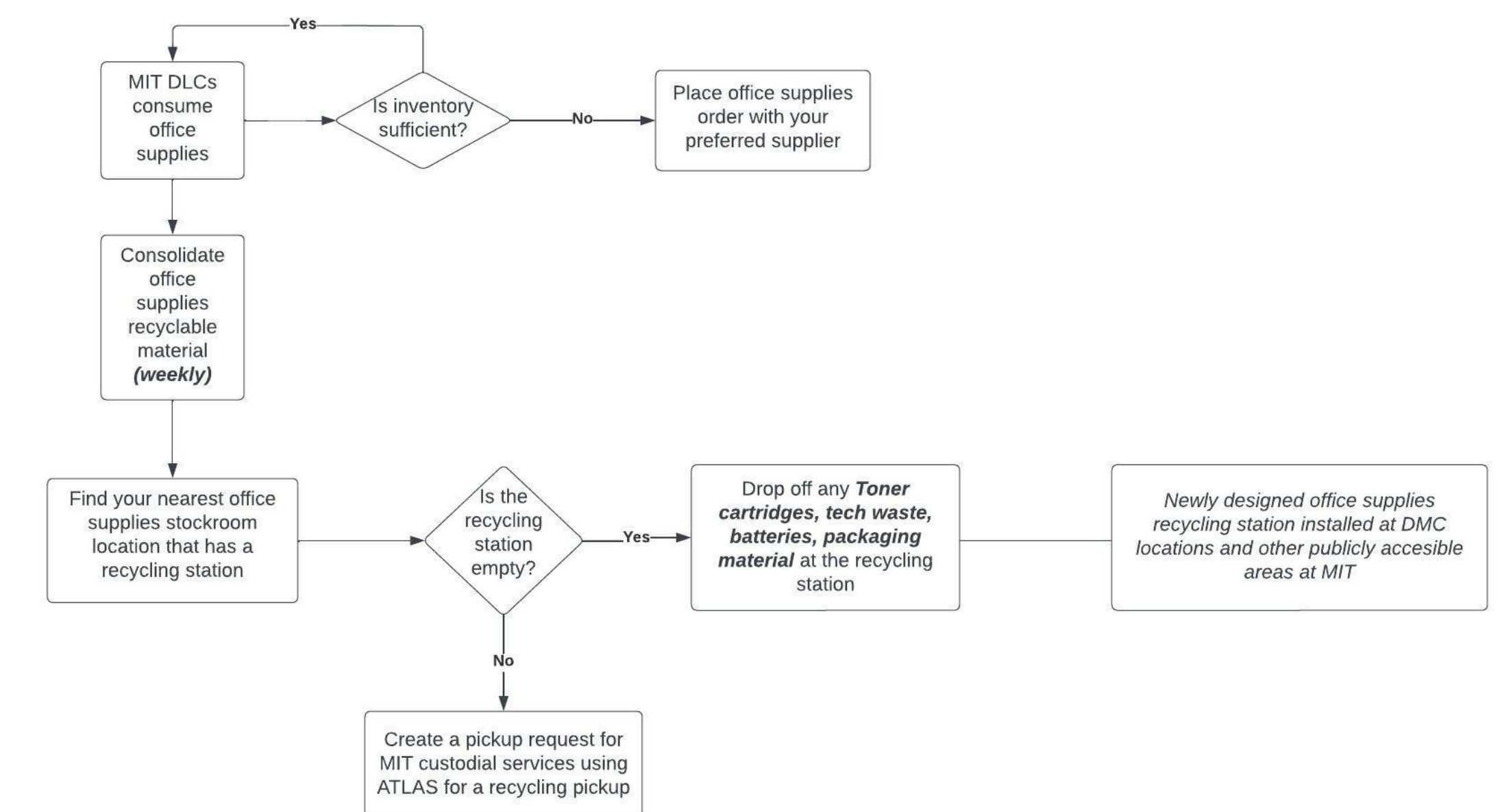
The Problem

- Can we create a supply chain design on the MIT campus that can consolidate the last mile delivery of office supply shipments and in also create new streams of recycling and takeback?
- Can we create synergy between the forward loop and the reverse loop of the office supplies supply chain and bring them closer? How can we co-create a solution with respective DLC stakeholders and present them with options that promotes sustainable procurement while not dramatically changing their existing workflows?

Methodology

- Conduct field visits and map out the current order fulfillment process.
- Analyze and categorize historical overall spend data of top SKUs, using forecasting with trend method in defining proposed stock room model
- Conducting an engagement survey and buyer engagement in understanding and motivating consumer behavior towards sustainability.
- Designed an operational framework for a office supplies stockroom that can be implemented in future pilot programs at MIT.

Results



- Operations of the reverse recycling flow of office supplies.

Expected Contribution

- Collaboration with original equipment manufacturers for achieving operational excellence in office toner cartridges takeback schemes at MIT.
- Created an operational framework for a stockroom deployment at E38 to foster sustainable purchasing and takeback design in a decentralized environment like MIT's.
- These results can be scaled up and customized for any large organization with decentralized operations.
- Reduced the gap between a forward loop and a backward loop in a supply chain design which encourages sustainable behavior.
- Designed an office supplies vending machine based on historical purchasing data, weekly burn rate and replenishment time for each SKU.

Pranav Prakash



Shah Akibur Rahman

