

Determining when and how to utilize a pull system

Alexander Hantelis and Gustav Östlund, June 2022

Department of Industrial Management and Logistics, Lund University

Push and pull are two fundamental principles for handling movement of material. It is not obvious which principle that is preferable and when determining between push and pull it requires a thorough understanding of them. As of today, studies that are comparing when a push system or a pull system is appropriate are limited in numbers. This thesis investigates when it is appropriate to utilize a pull system and how a pull system can be designed.

Tetra Pak is a company that has been utilizing a push system for movements of material between their warehouse and their production. To decide when it is appropriate to utilize a pull system and how a pull system can be designed, their material flow have been investigated.

To accomplish this a framework was developed. The framework provided guidance for what data that should be collected and how it should be analyzed. Further, the result of applying the framework was guidelines for when and how to use a pull system. This framework was applied at Tetra Pak and the process of applying it consisted of several steps.

To start with the current state was mapped and evaluated. This was done based on interviews, observations, and existing research. The mapping of the current state and the evaluation gave an indication of how the material flow were currently functioning and what the current context at Tetra Pak was.

To determine when it is appropriate to utilize a pull system the characteristics of the material flow was analyzed. The characteristics investigated were product

variety, production complexity, demand variety, and the presence of disruptive behavior. This investigation of the characteristics of the material flow resulted in the creation of several guidelines for when it is appropriate to utilize a pull system.

For determining how a pull system can be utilized two parts were performed. Firstly, guidelines for when different sorts of pull methods would be the most efficient to utilize was created. Five characteristics of the material flow were of interest for this. These were complexity of production, flexibility, product variety, control requirements on the material, and how close to maximum production capacity the production is operating. Secondly, concrete guidelines for how the pull method should be utilized was developed. This was achieved by considering the requirements of a pull system and comparing them to the situation at Tetra Pak.

As a result, the thesis has contributed within the areas of: (1) providing knowledge on how to link warehouse and production, (2) how to compare the two principles of push and pull and determine the most appropriate one, (3) with developing a framework for how to compare push and pull and how to design pull systems that can be used in other environments, and (4) the eleven guidelines created by applying the framework at Tetra Pak are generalized and can be utilized in other environments.

For further reading, see *Linking warehouse with production - Determining where and how to design a pull system at Tetra Pak* by Alexander Hantelis and Gustav Östlund (2022).