Organizational Optimization of a Distribution Center

Graduate

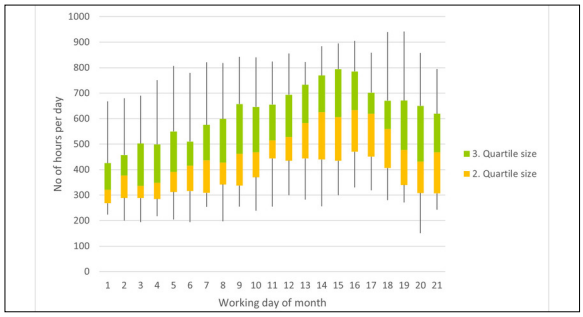
Raffael Römer

Problem: Logistics is often the last link in the order processing chain in B2C, and products must be delivered according to the orders on short notice. The result is a highly fluctuating workload within a month as well as between months. In the case of the company concerned, the ratio of peak days compared to days with little work is about 4:1 within a month. These fluctuations are primarily balanced with temporary staff. Currently, a 3:1 split of temporary employed staff to permanent staff is used.
The objective of this work is to develop and examine different approaches how the operation of a Distribution Center (DC) can be optimized in this challenging environment. The focus is on the optimization of the staffing concepts to ensure order fulfilment at the lowest possible cost. This includes the provision of personnel, personnel deployment, as well as technical improvements and their impact on staffing.
The work primarily focuses on a specific DC in Switzerland, but the insights gained are transferable to other DCs.

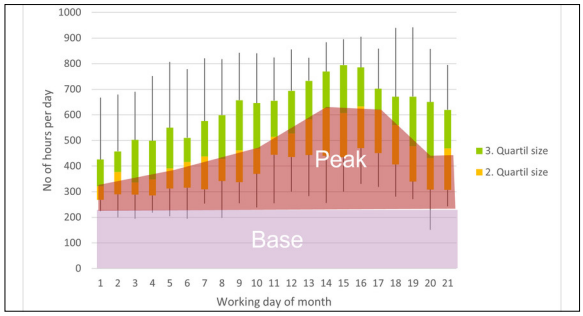
Approach: The chosen procedure includes an in-depth analysis of the current organization and the workload to lay the foundation for a future optimization of the staffing concept. The following procedure was applied:
1. Assessment of the current organization of the DC.
2. Analysis of the workload and hours worked in the observation period from July 2020 - June 2023.
3. Comparison and evaluation of different employment models according to their effectiveness.
4. Assessment of technical improvements to optimize personnel requirements in particularly challenging areas.

Result: The analysis showed that the current employment model is well suited to cover the demand in terms of speed and flexibility and it leaves only very little room for optimization.
In contrast to this insight, a feasibility study has proved that automation can make a decisive contribution to reducing the numbers of working hours required. Additionally, the automation helps to reduce peaks in workload.
Compared to adjustments in the employment model, the automation of processes and procedures will lead to significant overall cost savings. The required number of working hours can be reduced by up to 25% for the entire DC through a single investment, resulting in very high cost-effectiveness.
Based on these findings, implementation is urgently recommended.

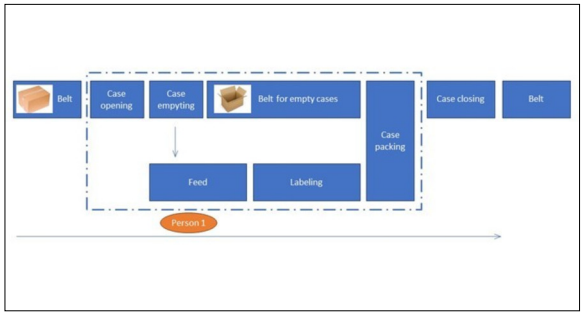
Volatility of required working hours based on data from the fiscal years 2020 - 2023. The error marks cover 90%.
Own presentment



Base & peak employment model with a larger proportion of permanent employees to cover the basic workload.
Own presentment



Concept for automated labeling street that can lead to a significant reduction of staff required for order fulfillment.
Own presentment



Advisor
Prof. Dr. Katharina Luban

Co-Examiner
Stefan Kurpjuweit , Accelleron Industries

Subject Area
Business Engineering