Controlling and reducing case picking in the supply chain – a case study of Unilever & Kuehne + Nagel

Executive summary - Master Thesis TIL Maartje Wammes – August 2015

Unilever is one of the world's leading Fast Moving Consumer Goods (FMCG) companies and has been named to have the best supply chain in Europe. Moreover, Unilever has been named as one of the leaders of the Food industry group in the Dow Jones Sustainability Index (DJSI). However, with Unilevers Sustainable Living Plan (SLP) in mind, a continuous improvement of the performance is desirable. One of the inefficiencies that can be identified in the logistical processes of the supply chain is case picking at the distribution centre (DC) of Kuehne + Nagel (K+N) in Veghel. Order picking can be done in full pallets (FP), full layers and (single) cases and is the most costly and labour-intensive activity in almost every warehouse. Picking in single cases (case picking) is the only order picking that is still done manually at the K+N DC and is therefore considered to be the most inefficient order picking method. In addition, a research of K+N in 2013 identified that the actual amount of case picking (at K+N) was almost six times higher than the planned amount of case picking (as Unilever expects), resulting in an even more complex issue. It is expected that case picking can be better controlled and reduced, this leads to the following main research question in this thesis:

How can case picking be controlled and reduced in a sustainable way for the Retail customers of the foods distribution centre in Veghel?

With the use of this knowledge the case study of Unilever and K+N is investigated thoroughly. An analysis in Excel of 2014 picking data resulted in the observation that in 2014 the actual amount of case pick, 11.2% of the total Retail volume is actually 23 times higher than the planned case pick (0.47%) for Retail customers and products, which indicates that this discrepancy is even more crucial for Retail customers. Based on interviews and observations a total of eight causes have been identified for case picking:

1. **Customer Restriction 1 (CR1) – restacking**: The customer requires another size of pallet than the source pallet which means the pallet (or layer) has to be restacked onto another size of pallet by hand.
2. **Non-ALP products**: Layers that cannot be handled by the ALP (Automatic Layer Picker) due to size, weight, packaging have to be picked manually.
3. **Lead time**: Same-day delivery orders in full layers are sometimes not handled by the ALP because of the short lead time.
4. **Incomplete inbound**: Incomplete pallets are send to the picking street and thus case picked.
5. **Customer Restriction 2 (CR2) – BBD (Best Before Date) intolerance**: The customer does not accept the used BBD tolerance but requires strict FEFO (First Expired First Out). This restriction leads to more case pick due to BBD for these customers.
6. **BBD**: Due to the FEFO guarantee with tolerance sometimes cases out of the picking street need to be picked first while the customer ordered in FP and layers. This can result in that FP and layers are picked manually.
7. **Order behaviour**: The customer orders in cases. This is the only cause that is planned by Unilever.
8. **Out of stock K+N**: When stock out occurs but everything that is available is still delivered this might result in delivering cases instead of FP or layers.

With this knowledge a model and data analysis of the picking data of 2014 is used to identify the contribution of each cause to the overall case pick problem. Figure 1 gives an overview of the share of these causes in the total case picking volume.

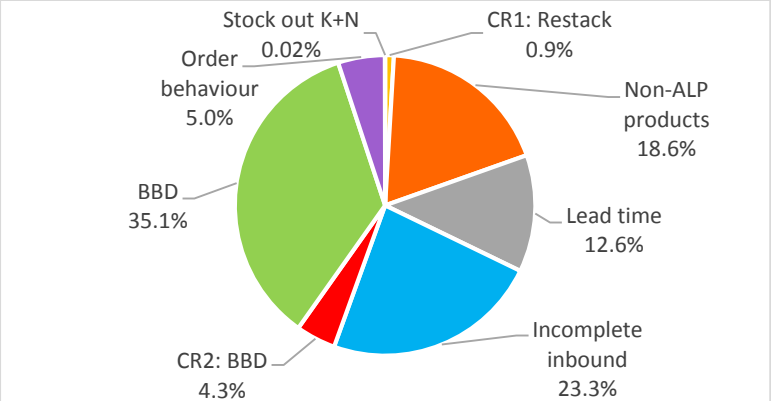

Figure 1: Share of causes in case picking volume

When all case picking can be eliminated the costs for picking these cases can be reduced with a maximum of 38% yearly for both Unilever and Kuehne + Nagel. The total handling out costs can therefore be reduced with maximum 10%. What should be noted is that the causes CR1 and lead time are almost fully (99%) eliminated in 2015. After identifying the causes and their sizes, solution elements are identified based on literature study, observations, interviews and logical reasoning. Focusing on eliminating the weakest links first, multiple alternatives are created by combining independent solution elements. The cause BBD can only be eliminated when also the cause incomplete inbound and customer behaviour (order behaviour, CR1, CR2) are fully eliminated: when no cases are coming in and no cases have to go out no cases will be picked due to BBD. This identified vicious cycle is important to take into account since eliminating this can result in 84% of the total possible cost savings. In total 14 alternatives are created and they are evaluated on the following criteria: Costs, Customer service, implementation time and the amount of waste created.

Two alternatives are identified that control and reduce case picking the most. The first one is focused on eliminating the vicious cycle and the second one on reducing the cause non-ALP products. The elimination of the vicious cycle is reached by separating the picking segments (FP, layers, cases) from each other and the non-ALP products cause is reduced by rounding up orders in more than 80% of a FP. The implementation of the following combination of solution elements answers the main research question and will lead to a better control and large reduction of case picking:

- A virtual separation of the case picking activities from the layer and pallet picking activities (for both the Retail and OOH/FS segment)
- The incomplete inbound is removed by topping off incomplete cases and sending the cases to the case pick segment and the rest of the pallet in full layers to the ALP**.**
- Implementation of the 95% rule where incomplete pallets that are more than 95% complete are handled as complete pallets.
- Changing the FEFO guarantee is required to prevent BBD issues to still occur.
- Rounding orders of customers in cases to layers.
- Stop treating wholesale customer C as a Retail customer.
- Prohibit restacking restriction for the left customers
- Rounding up orders in more than 80% of a FP.

Since the effect of the BBD on the creation of waste is hard to determine this research cannot give the exact effect of the alternatives on this. Therefore it is recommended to perform a simulation study to gain more insight in this effect and this will give a more decisive answer into to what extent the separation has to be made (hard or soft border), the FEFO guarantee has to be changed (fully eliminated or only guarantee for ordering in FP and/or layers), and customers have to be prohibited to order in cases.

A cost reduction for picking of this part of handling out (which is 11% of the total Retail volume) of 33% can be identified. This is 90% of the possible cost savings that were identified including yearly costs for doing this. Only a one-time investment is required of max 10% of the cost savings. In addition, since this identified combination of solution elements also affects the OOH/FS segment for this segment also a cost reduction can be identified.

These solution elements can be implemented in two simultaneous steps. The first step is to make changes in the systems MLS and OMS of K+N. This can be done by hiring the operator of K+N systems to implement this. It is expected that within a period of three months the virtual separation, indicating when a pallet is 95% full, rounding orders in cases and orders of non-ALP products in more than 80% of a full pallet can be implemented in the system. What is needed extra is that at K+N employees have to be informed and trained to perform the topping off of incomplete inbound and handling 95% FP as full. The second step that has to be taken involves the customers and can be done during the yearly contract negotiations between Unilever and the customer.

This case study has provided solutions for the DC of K+N in Veghel. However, (some of) the identified solutions will also be of use for other DC's of both Unilever and K+N. Moreover, this research is especially relevant for other Food supply chains since they experience the same issues concerning BBD. Furthermore it is recommended to also implement rounding up 80% FP orders for ALP products since this allows for the shift from layers to pallets as well. The exploration of BBD dynamics in this research is also useful for literature research. Since it has been identified that a gap in literature exists around this topic, this research is able to give more grip on these dynamics. Further research into this effect would be very useful for supply chain research and companies with such issues.