The Warehouse Layout Design Framework for Fast Growing Companies

Development of warehouse layouts is a complex task. A volatile growth adds to the complexity. Adding flexibility to the layout can help align the warehouse to the current/future operations. Together with more emphasis on forecasting the warehouse performance can be increased.

Many believe that the success of companies solely lies in their revenue. But, has anything, or anyone for that matter, been successful while wasting money? The costs of a company gain importance as competitiveness in the market increases. In logistics, one of the large cost drivers is the warehouses. The high costs origin from labor-intensive activities and/or high investment cost of equipment and facilities. For companies facing rapid growth, accurate forecasts can be hard to develop. Due to the nature of warehousing, changes are complex and costly. Therefore, this study has found a need to visualize the connection between flexibility for uncertain demand and warehouse layout design.

To find a warehouse layout design that can support the company’s operations in an efficient way, many aspects must be explored. The results of this study have emphasized aspects like the warehouse objective, product characteristics, expected demand and the activities performed in the warehouse today and in the future. To facilitate a design process, which can take these aspects into consideration, a framework has been developed, the warehouse layout design framework. A case study at Oatly, a Swedish company producing oat-based dairy products, has been conducted and refined the framework. The case at Oatly was chosen as the company is experiencing rapid growth. Increases in both sales volume and product portfolio has changed the demand on the warehouse and has made their current warehousing layout design insufficient.

The developed warehouse layout design framework is presented in figure 1 and is an eight-step framework divided into two parts. The first part aims to uncover the expected future operations of the company including the purpose of the warehouse and the in- and outflow to/from the warehouse. To find a solution that will be beneficial for a fast-growing company, large focus should be but on forecasting of the in- and outflows. In the second part the aim is to develop the physical warehouse layout including equipment to be able to facilitate the current and future demand as well as keep the flexibility needed for changes in both volume and product mix.
It is quite surprising that in today’s research forecasting has been found to be either missing or non-emphasized. The case study at Oatly has shown that the future demand and future operations have a large impact on warehouse performance and the sustainability of the layout design. With an unsure future, the effects on the warehouse become even more prominent. Analyzing order characteristics and measures such as the peak-to-average ratio have been found useful to identify seasonality and trends that can affect the warehouse on a weekly basis, but also over time.

The amount of activities performed in the warehouse is expanding as the trend of postponement in the supply chain is increasing. This means that the types of equipment and need for flexible space in the warehouse increase. The warehouse layout design framework takes these changes into consideration by considering the activities performed today. The potential future activity profile in the warehouse is also analyzed by defining the departments of the company that are stakeholders to the warehouse performance by considering effects of the corporate strategy. The framework also emphasizes the importance of establishing the warehouse in and out flow and the expected supply chain network and in the company.

The warehouse layout design framework can help managing cope with the complexities and trade-offs in the layout design process while the needed aspects are considered. The added focus on flexibility for future operations and forecasting has potential to increase the warehouse layouts potential to remain sufficient for the requested time period.

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