

# Foreword

Strategically, manufacturing companies intend to operate *on the edge* so that capacity and inventories (the so-called *supply*) are constrained and optimally balanced with demand. However, due to short-term demand fluctuations, this balance is difficult to achieve, and manufacturers often face temporary periods of under- and over-supply. In case of over-supply, production resources are badly utilized. In case of under-supply, some customers cannot be served on time or not at all. Demand Fulfillment (DF) takes care of such short-term situations when demand is higher than supply, when supply cannot be increased on time and when some customers have to be preferred over others. Then, the aim is offering a better service to the more important customers rather than to the less important customers.

The PhD thesis of Sebastian Vogel concentrates on the special case of DF when Make-To-Stock (MTS) situations prevail and customer heterogeneity is caused by a multi-stage sales hierarchy. In MTS situations, customers expect very short delivery times for final items. They want an immediate, but also reliable answer whether their requested products are already on stock in a nearby warehouse and just need to be delivered. Multi-stage sales hierarchies can often be found in big, internationally operating companies. To handle the huge and wide-spread customer base, the sales organization is structured hierarchically, e.g., a sales manager of a world region is responsible for several countries within her region, a country manager is responsible for several sales districts within his country, and a district manager is responsible for all customers within his district. Since production is often centralized and concentrated to one or a few production sites only, delivery times and delivery costs may be high and may vary substantially between the different regions, countries, and districts. The obvious conflict between customer expectations and supply chain reality necessitates a planning process where first scarce supply quantities are quoted iteratively, level by level, to regions, countries and districts on the basis of demand forecasts in a rather mid-term, capacitated *allocation planning* step. Then, reliable order promises are made on the basis of the bottom-level quotas in the short term when real customer orders materialize. The quotas are usually the results of negotiations between an upper level's sales manager and her corresponding subordinates at the lower levels. The danger of this myopic, iterative process is that quotas are allocated to upper-level segments which actually do not contain sufficiently profitable lower-level customer orders.

Sebastian Vogel is (to the best of my knowledge) the first one to complement this iterative, decentral allocation steps by profit-based considerations which allow exploiting customer heterogeneity in a way usually only an imaginative, fully informed, central planner could do. To achieve this, he brings together ideas from different scientific disciplines like supply chain management, supply chain planning, economics, graph theory, game

theory and operations research, respectively. His contribution is not only to propose a clever allocation mechanism. It is rather to open a—until now widely ignored—field of research, to structure and model it, and to discuss various aspects of potential applications. Reading this book is a pleasure. I can only recommend enjoying this pleasure.

Hohenheim, June 2013  
Prof. Dr. Herbert Meyr



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Vogel, S.

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