



Capacity allocation for demand of different customer-product-combinations with cancelation, no-shows and overbooking when there is a sequential delivery of service

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Room: Lecture Theatre 2

Abstract: We consider a problem where different classes of customers can book different types of service in advance and the service company has to correspond immediately to the booking request confirming or rejecting it. Due to the possibility of cancellation before the day of service, or no-shows at the day of service, overbooking the given capacity is a viable decision. The objective of the service company is to maximize profit made of class-type specific revenues, refunds for cancellations or no-shows as well as overtime cost. For the calculation of the latter, information of the underlying appointment schedule is required. Throughout the paper we will relate the problem to capacity allocation in radiology services. Drawing upon ideas from revenue management, overbooking, and appointment scheduling we model the problem as a Markov decision process in discrete time which, due to proper aggregation can be solved to optimality with stochastic dynamic programming. In an experimental study where we employ data from the radiology department of a hospital we show that the detrimental effects of the aggregation are negligible. Furthermore, we compare the optimal policy to four heuristic policies, where one is currently in use. We can show that the optimal policy significantly improves the currently used policy and that a nested booking limit type policy closely approximates the optimal policy and is thus recommended for use in practice.

Bios: Prof Rainer Kolisch holds the Chair for Service and Operations Management at the TUM School of Management, Technische Universität München. He graduated with a Diploma in Industrial Engineering from Technische Universität Darmstadt and obtained a doctoral and the Habilitation degree from the University of Kiel. Before coming to Technische Universität München he has held chairs at the Technische Universität Darmstadt and Technische Universität Dresden. Professor Kolisch has published in international journals such as Management Science, Naval Research Logistics and IIE Transactions.

Hans-Jörg Schütz is a PhD student at the TUM School of Management, Technische Universität München. He holds a Diplom in Industrial Engineering from Technische Universität Darmstadt. His research focuses on revenue management, approximate dynamic programming and health care services.