Summary

People play an important role in a variety of operations. People affect operations performance through their engagement with – and input to – operations by, among others, making decisions, performing tasks, solving problems, and implementing policies. Traditionally, research in Operations Management builds on neoclassical economic theory by treating people as rational agents. However, often, the behavior that people demonstrate in practice is different from rational choice. To understand the implications of this behavior for operations and to take efforts to improve decision-making and operational performance, it is important to examine individual decision-making. Therefore, this doctoral thesis investigates how individuals make decisions in operations settings where there is little understanding of human decision behavior. It does so by focusing particularly on two aspects that affect individual decision-making: individual judgment in decision-making (heuristics and biases associated with human cognition) and individual and social goals and preferences that affect decisions. This thesis consists of four empirical studies that are presented in separate chapters and use different research methods (behavioral laboratory experiments and case studies) to study a particular operational decision-making task.

Chapter 2 examines how people make inventory ordering decisions when there is uncertainty in the total inventory available to fulfill demand caused by either supply uncertainty or inventory record inaccuracy. While many studies have examined how people make ordering decisions under demand uncertainty, there is little understanding of how people make ordering decisions under uncertainty in supplies or inventories. As these uncertainties may have important cost implications for firms due to needless orders (increasing inventories and related costs) and foregone sales (increasing stock-out costs), it is important to understand human decision-making under such uncertainties. The findings from the incentivized laboratory experiments indicate that ordering decisions under both supply uncertainty and inventory record inaccuracy deviate from the profit-maximizing order quantity. Order quantities of low-profit margin products are above the profit-maximizing quantity. This may be explained by a biased probability assessment in such conditions due to the availability heuristic and overconfidence. It is also observed that order quantities placed under inventory record inaccuracy are higher than those placed under supply uncertainty. Estimates of a behavioral model indicate a stronger aversion to leftovers under supply uncertainty than under inventory record inaccuracy. This may explain the more conservative order quantities observed under supply uncertainty. These findings stress the practical importance to mitigate uncertainties in supplies and inventories to reduce associated costs. Additionally, practitioners are recommended to prioritizing initiatives to reduce inventory record inaccuracy (e.g., inventory audits, RFID technology) over initiatives to reduce supply uncertainty (supplier improvement, supplier diversification).
Chapter 3 focuses on how people make decisions about the allocation of scarce inventory among sales channels (i.e., from the perspective of the supplier). Such decisions are important for firms as they can reduce profitability but also may create tension between parties in the supply chain. While people play an important role in inventory allocations in practice, there is scarce understanding of how they make these decisions and what factors affect allocation decisions. The study presented in Chapter 3 is the first to examine how people make allocation decisions and what factors affect these decisions beyond rational profitability concerns. Behavioral models are formulated based on behavioral theories and hypotheses resulting from the model predictions are tested using data from incentivized laboratory experiments. The findings indicate that allocations deviate from the profit-maximizing allocation quantities. Risk aversion and loss aversion reduce subjects’ allocations to sales channels where they take the risk of having unsold inventory or possibly may experience losses due to item returns. The observed interaction effect between risk appetite on the one hand and loss aversion and mental accounting (i.e., time-discounting and prospective accounting) on the other hand provide insight in the conditions under which individual preferences play a role. The findings also suggest that multiple individual preferences simultaneously affect allocation decisions. Overall, the findings provide novel insights in behavioral effects on allocation decisions and that allocation decisions may be different depending on the way in which information is presented even though these different ways of information provision do not affect the rational, profit-maximizing allocations. The chapter gives suggestions on how the way information is presented may improve allocation decisions.

Chapter 4 is concerned with transport planning decisions made by transport planners. While prior studies have investigated individual judgment in planning decisions (i.e., cognitive processes related), this chapter is the first to study the role of individual and social goals in transport planning. Such a perspective provides novel insights to develop planning processes that take into consideration human behavior. The purpose is to obtain more detailed insight in the role of individual goals and social preferences in operational planning decisions. A case study was conducted at a Logistics Service Provider. The findings describe how transport planning decisions are affected by planners’ individual goals to minimize time/effort they spend or to maximize their productivity as well as planners’ social preferences for reciprocity and group identity. The propositions that are formulated serve as empirical basis for future research on the role of individual goals and social preferences in planning. Overall, the findings suggest that traditional economically based incentive schemes may be insufficient to motivate transport planners. The chapter provides practical insights in directing planner decision behavior based on the individual and social goals they pursue.

Chapter 5 investigates how to assess and facilitate warehouse safety by examining individual perceptions of the importance of aspects of warehouse safety. Although safety is important in the logistics services industry, little is known about how to measure warehouse safety and how to stimulate safe behavior in warehouses. Based on a literature study, a theoretical framework has
been developed, distinguishing aspects of safety culture and safety behavior and listing factors that may affect how safety culture translates to safety behavior. A case study at a Logistics Service Provider indicates that technology aspects are found important since they are considered a prerequisite for warehouse safety. Being role models for the warehouse employees, team leaders are indicated to play an important role in warehouse safety. Also, employees find intrinsic reasons to behave safely better motivators than extrinsic reasons. Overall, Chapter 5 gives an overview of the aspects of safety that are important in warehouses but also provides insights in the importance of these aspects, which can be of practical value when efforts are taken to improve warehouse safety.

Overall, the research in this thesis provides insight in individual decision-making in particular operational decision tasks. The findings contribute to both the academic and managerial understanding of human decision-making in operations but also open up avenues for future research. For one, it would be interesting to examine how cultural aspects – besides individual judgment and goals and preferences, which are the focus of this thesis – affect decision-making. Additionally, further research on inventory ordering under supply uncertainty and inventory record inaccuracy and on inventory allocation decisions in practice is suggested to provide insight in practical decisions and quantify effects on operations performance. Moreover, to strengthen the results from the case studies on transport planning and warehouse safety, further research triangulating qualitative insights with e.g., transaction data or survey results is recommended. More generally, this thesis encourages further research to explore the consequences of behavioral effects on decision-making for operations performance, and how to mitigate behavioral effects that reduce decision quality to improve decision-making.