Research School for
Operations Management
and Logistics

Trust or control? Governance of algorithmic decision support in inventory planning: A Principal-Agent perspective

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Human planners frequently override algorithmic recommendations in inventory planning. Such overrides arise from three distinct mechanisms: private information, defined as case specific operational knowledge not observed by the algorithm; behavioral biases, modeled as a systematic preference for ex post service accuracy over firm profit; and misaligned incentives, reflecting differences between planner utility and the firm's objective. This study develops a principal-agent model to characterize planners override behavior and to examine how control rights can serve as a coordination mechanism between planners and algorithms to reduce unproductive overrides and improve firm profit. To assess the empirical validity of these mechanisms, we structurally estimate the model using detailed override data from an industrial spare parts inventory planning setting. Our results demonstrate that governance of human-algorithm interaction is essential for realizing the value of algorithmic planning tools. Control rights can effectively balance autonomy and automation, reducing unproductive overrides while preserving the value of human planners' private information. The model provides actionable guidance to balance human judgment and algorithmic efficiency, informing the design of decision support tools and related role definitions in organizations.