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Bipolarity in reactions to operational 'constraints': OM bugs under an OB lens

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Abstract

In the 1980 inaugural issue of the *Journal of Operations Management*, Powell and Johnson stressed the need to introduce behavioral factors into research models of operational processes and performance. While some progress has been made since then, contemporary authors argue that limited dialogue between operations management and behavioral researchers continues to restrict the interpretability of such studies. Drawing on expertise from both operations and behavioral research, and motivated by a case example, we intend to further this dialogue. In doing so, we outline interdisciplinary commonalities and several methodological pitfalls that those studying the links between resource constraints and operational performance should take into account when developing new research. These issues range from appropriate model conceptualization to operationalization for empirical studies. Recommendations for appropriately confronting methodological concerns related to these issues are provided.

Keywords: Behavioral theory; Operations; Constraints; Inverted-U

1. Introduction

Powell and Johnson (1980) stressed that if workers have "one iota of discretion" regarding the performance of productive systems, their behaviors and the determinants of these behaviors must be incorporated in the development of meaningful research models. Citing criticisms made by previous management researchers (e.g. Cummings, 1977), they emphasized that sufficient behavioral considerations have been long overdue in the operations management literature. Notable efforts to address this limitation have been made since that time through studies of the links between operating decisions, worker behavior, and performance. Authors in the field of operations management continue to stress that additional effort on this front is needed (Amundson, 1998; Hayes and Hill, 2001; Rungtusanatham, 2001; Schultz et al., 2003).

A fundamental question remains, however, as to how additional research aimed at spanning operational and behavioral issues should be conducted. Specifically, when studying the linkages between elements common to both operations management and behavior research, such as resource constraints and operational performance, what are the appropriate factors, relationships and methods of analysis that should be used to provide meaningful and lasting contributions? This key research question on practice remains insufficiently addressed in part due to its necessarily complex and interdisciplinary nature. Answering it for researchers in operations management requires a willingness to consider

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established research in alternate fields such as organizational behavior and psychology. It also requires that researchers pursuing studies that span these disciplines are aware of and take measures to avoid the difficulties in interpretation that past research on these topics has encountered.

The present note is designed to outline some of the interdisciplinary commonalities and methodological pitfalls encountered in studying the links between constraints and operational performance. Our objective is to contribute to research practice by describing these typically overlooked issues and ultimately suggesting tactics for addressing them. These issues range from appropriate model conceptualization to operationalization and analysis in empirical studies. Recommendations for appropriately confronting methodological concerns related to these issues are provided.

The rest of the paper presents the study. In Section 2, we begin by presenting a case example of constraints management at a large urban hospital to motivate a discussion of basic conceptual interpretations in the performance constraints domain. In discussion, we draw on specifications from operations management and behavioral research and briefly review notions of both the behavioral and mechanistic (non-behavioral) dynamics of performance constraints. By simultaneously considering established views of operational dynamics and behavioral theory, Section 3 then discusses the operationalization of performance constraints, particularly, workload and potential problems with current practice. A demonstration of the non-monotonic dynamics between workload and performance is illustrated through the use of data drawn from the hospital's ERP system. The final section concludes with the recommendations for future research.

2. Conceptual interpretations

Through their meta-analytic review, Villanova and Roman (1993) claim that the ability of research to inform practice in the management of constraints is "critical given management's interest in situational changes that can influence worker contributions". Equally critical is the ability of researchers in alternate fields to inform each other on this topic and hence facilitate the practicality of research findings and conclusions. Notably, the field of operations management also has a long tradition of identifying, "managing around" and seeking to eliminate constraints in the workplace, though this literature is seldom cited in behavioral studies of constraints. Regardless, the Theory of Constraints (TOC), based on the ideas popularized by the Goal (Goldratt and Cox, 1986), has had one of the greatest impacts on the management community both in terms of theoretical suggestions and practical application (Herroelen and Leus, 2001; Fry et al., 1992). According to TOC, a "constraint" is anything that limits a system's ability, or the ability of the individual workers within that system, to attain higher levels of performance. The management of constraints focuses on the identification, adjustments around, and modification of such constraints.

2.1. Managing constraints: a case

To emphasize the impact that managerial views of "constraints" can have on operating policies, and as an example of the role that worker behavior can have on how these policies impact operational performance, we consider the case of the materials management department at a large urban hospital. The first author spent 15 months collecting field data primarily through interviews with the performance audit team, post hoc interviews with the staff and clearance to internal (i.e. ERP archived) data and reports to verify the interview findings, wherever possible.

The main responsibilities of the materials management department involve the management of incoming and outgoing inventories of one-time use items (e.g. latex gloves and saline solution) as well as multi-use items such as surgical gowns for which cleaning was outsourced. The department is also responsible for equipment decontamination/sterilization, surgical kit assembly (i.e. the assembly of the variety of sterilized surgical tools required for individual patient cases), and the recovery of "lost" items due to either to emergent cannibalization of sterilized goods or non-returns after use. Due to complaints from the nursing and surgical staffs regarding poor levels of accuracy and consistency in the services provided, an internal audit of the performance of the materials department was conducted by the hospital more than a year prior to this paper. The internal audit team comprised of hospital administration staff that practiced TOC concepts and methods.

Operations managers for the materials department had argued that they were constantly faced with high levels of turnover and thus chronically low levels of experience among their staff regarding the procedures in place. Further investigation by the audit team discovered not only the low levels of consistency and accuracy previously reported, but also an environment that seemed to foster relatively high levels of stress. These self reported levels of stress were not only higher than average levels at other materials management