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A Data Envelopment Analysis Approach to Estimate IT-Enabled Production Capability

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Abstract

Information systems researchers have drawn on the resource-based view (RBV) and dynamic capabilities theory to offer a sharper theoretical lens to study the impact of information technology (IT) enabled capabilities on organizational performance. In this study, we propose a new conceptualization of IT-enabled production capability, based on the ability of a manufacturing plant to use its mix of resource inputs to maximize its process outputs. Our approach extends the literature on firm capability using data envelopment analysis (DEA), a nonparametric approach for estimating relative efficiencies of decision-making units. We tested our models using plant-level data collected from a sample of U.S. plants. Our study makes a key contribution by developing a new methodology to measure IT business value with respect to the role of IT-enabled production capability. We operationalize a new DEA-based measure of capability using the relative efficiency of converting plant inputs into process outputs, a significant departure from extant research that has primarily focused on subjective and absolute measures to conceptualize capability.

Keywords: Production capability, data envelopment analysis, efficiency, resource-based view, information technology