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# Behavioral operations and the dynamics of emergence: a call for multilevel research

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## Abstract

**Purpose** – This article aims to advance an emergent multilevel perspective as a useful lens for capturing the dynamics that shape behavior in real-world operational settings.

**Design/methodology/approach** – The article adopts a conceptual approach by examining three foundational domains of behavioral operations (BO) research–inventory management, supply-chain management and productivity management–to clarify the analytical boundaries of prevailing single-level and top-down perspectives. It then illustrates the potential of an emergent multilevel lens to advance the understanding of how behavioral patterns develop over time through interaction, coordination and role dynamics across organizational levels.

**Findings** – By reframing core domains through an emergent multilevel perspective, the article demonstrates the added explanatory power and analytical clarity this approach offers and outlines the theoretical and methodological opportunities it opens for future research.

**Originality/value** – The article strengthens the conceptual foundations of BO by complementing existing perspectives with an emergent, interaction-driven view of behavioral dynamics. In doing so, it lays the groundwork for investigations that closely align with the multilayered nature of everyday operational activities.

**Keywords** Behavioral operations, Emergence, Multilevel, Productivity management,
Supply chain management, Inventory management

**Paper type** Conceptual paper

## 1. Introduction

Over the past two decades, BO has gained increasing prominence in the field of Operations Management (OM). BO has been conceptualized in multiple but converging ways. Croson *et al*. (2013) describe it as "*the study of potentially non-hyper-rational actors in operational contexts*". Gino and Pisano (2008) emphasize its attention to "*human behavior and cognition and their impacts on operating systems and processes*." More recently, Fahimnia *et al*. (2019) have positioned BO as a research stream addressing behavioral deviations from rational performance optimization, with a particular emphasis on decision-making processes, both within and between organizations.

By relaxing the assumption of fully rational individuals, BO has contributed to a deeper understanding of OM dynamics (Cui *et al*., 2025; Goudarzi *et al*., 2023): it has revealed patterns that normative models (i.e. prescriptive approaches grounded in idealized optimization) often fail to capture, highlighting how actual decisions and actions depart from the premises on which they rely (e.g. Tokar, 2010; Donohue *et al*., 2020). As a result, BO has redirected scholarly attention from utility-maximizing representations of organizational actors toward more realistic accounts in which cognitive limitations, non-standard preference structures, and social considerations have non-trivial influences on operational outcomes (Donohue *et al*., 2019).



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Consistent with these objectives, early BO research has predominantly adopted a micro-level perspective, centering analytical efforts on individual decision makers (Loch and Wu, 2007; Carter *et al*., 2024), as illustrated by seminal laboratory experimental work in settings such as the newsvendor problem (Schweitzer and Cachon, 2000). This focus reflects a deliberate analytical choice, since isolating individual behavior allows researchers to rigorously identify the specific cognitive facets that drive deviations from normative expectations (Croson, 2005; Croson and Donohue, 2002). Building on this foundation, subsequent work has extended the micro-level orientation in two complementary directions. On the one hand, some studies embed individual decision makers within small groups to more closely reflect salient features of operational environments, such as task structure, exposure to peer-related cues, or process interdependence among actors (Bendoly *et al*., 2010; Donohue *et al*., 2020). Importantly, in these settings, groups primarily define the technical and social conditions under which work is performed, decisions are taken, or comparisons are made, but the mechanisms of interest–and the associated behavioral outcomes–remain often theorized and measured at the individual level (e.g. Bai *et al*., 2022). On the other hand, scholars have employed top-down multilevel framings to examine how behavioral facets operate under different organizational arrangements (e.g. incentive schemes), thereby highlighting how higher-level choices and configurations affect individual behavior (e.g. Galeazzo *et al*., 2024).

Despite the substantial insights generated through these analytical framings, evidence from real-world settings points to the opportunity for a further step forward in the field of BO. This appears to be the case because many operational outcomes cannot be fully explained by individual-level choices or by centrally imposed rules alone. Rather, they reflect emergent collective patterns that arise from ongoing interpersonal exchanges among individuals working within groups characterized by mutual responsibilities, shared expectations, and interdependent coordination processes (Kozlowski and Chao, 2012). A clear illustration of these phenomena is offered by the case documented by Oliva and Watson (2011), which examines demand forecasting practices in a medium-sized consumer electronics manufacturer. Although formal inventory policies specified target stock levels and explicit cost–service trade-offs, sustained pressure from sales to ensure product availability, combined with finance seeking alignment with revenue targets and marketing questioning sales projections, led planners to introduce systematic distortions into demand forecasts. Over time, these interaction patterns resulted in forecast accuracy stabilizing at approximately 55% over a three-month horizon and inventory write-offs amounting to roughly 15% of annual revenue, equivalent to several million dollars in losses per year.

Accounting for such dynamics requires integrating micro- and macro-level analyses, beyond statistical averaging or top-down assumptions (Carter *et al*., 2015). It involves theorizing how individual interactions give rise to patterns of collective behaviors that over time become stable (Lemoine *et al*., 2026; Kuljanin *et al*., 2024). In other words, advancing BO research entails broadening attention to the bottom-up processes through which individual inputs gradually coalesce into higher-level patterns of behavior. This perspective resonates with several scholarly calls for a more integrated understanding of decision-making processes. Eckardt *et al*. (2019), for instance, highlight that while "*efforts to integrate micro and macro perspectives continue to face challenges*," such integration is essential to strengthen the theoretical contribution and societal relevance of BO. Similarly, Kozlowski and Klein (2000) argue that "*micro and macro approaches each capture a portion of the picture but not the whole*". In sum, an emergent multilevel perspective can help explain how roles, expectations, and interactions produce collective behavioral patterns over time.

This paper seeks to advance an emergent multilevel perspective in BO by illustrating its theoretical relevance and practical applicability. Building on the recommendations of Svanberg (2020), we start presenting the three most widely studied domains in the BO literature (i.e. inventory management, supply chain management, productivity management) to characterize their current state of knowledge and analytical boundaries. We then outline the defining features of an emergent multilevel perspective. Finally, we apply this perspective to

reinterpret these domains, illustrating how an emergent multilevel lens can extend established insights and conclude with key implications.

## 2. Literature background and current state of knowledge in BO

Traditional OM research has largely sought to explain the performance of aggregate entities (e.g. firms, plants) by linking structural decisions to macro-level outcomes. In the context of production management, for example, the adoption of practices like just-in-time and total productive maintenance is typically associated with improvements in plant performance. Similarly, studies on emerging technologies often relate their adoption to gains in firm-level productivity. In supply chain management, decisions concerning buyer–supplier relationships have been associated with sustainability and financial dimensions.

This perspective frames system-level design and structural configurations as primary levers of performance, often resting on the assumption that specific interventions will produce consistent outcomes. Yet real-world evidence suggests a more complex reality: the same configurations may lead to divergent results depending on how they are interpreted, enacted, and embedded in daily activities. A well-known illustration is the contrast between Toyota and Nissan in the 1980s. Despite operating in the same industry, facing similar market and technological conditions, and adopting the same lean principles, Toyota achieved productivity levels roughly 50% higher (Cusumano, 1988), highlighting that structural choices do not produce effects on their own. Their outcomes depend on the underlying, often informal, conditions that enable meaningful and sustained implementation by those responsible for putting them into practice.

In response to these challenges, BO emerged in the 2000s as an effort to introduce greater realism into OM (Bendoly *et al*., 2006; Donohue *et al*., 2020). Drawing on insights from applied and cognitive psychology as well as behavioral economics, BO research has placed a central focus on bounded rationality and the cognitive constraints that influence how operational actors make choices in situations characterized by uncertainty, imperfect feedback, and information overload (Croson *et al*., 2013). Within this stream, numerous studies document systematic deviations from normative expectations, clarifying the role of biases, heuristics, and non-standard preference structures in shaping operational outcomes (e.g. Schweitzer and Cachon, 2000; Tokar, 2010; Katok, 2011). At the same time, contributions informed by social psychology have highlighted the influence of fairness considerations, trust, and social preferences, while work drawing on organizational behavior has explored how leadership, role expectations, and coordination processes shape decision making and task execution (Fahimnia *et al*., 2019; Goudarzi *et al*., 2023).

The breadth of BO's theoretical foundations is reflected in the diversity of areas it investigates. Fahimnia *et al*. (2019), Donohue *et al*. (2019), and Cui *et al*. (2025) identify several domains addressed in BO research, including, among others, inventory management, supply chain management, productivity management, project management, new product development, transportation and logistics management, quality management, firm resilience, and product recall. Across these domains, BO research has informed the design of decision rules, policies, and operational processes that are more robust to systematic behavioral regularities (Donohue *et al*., 2020).

Methodologically, BO research has relied predominantly on experimental designs (e.g. Perera *et al*., 2020; Croson and Donohue, 2002). Laboratory experiments have played a central role, enabling researchers to isolate specific behavioral mechanisms under controlled conditions and to document systematic deviations from normative models (e.g. Croson, 2002; Carter *et al*., 2024). Complementing laboratory evidence, a growing body of work has employed field experiments to strengthen the external validity of findings (Giannoccaro, 2013; Donohue *et al*., 2019). In addition to experimental work, some contributions have relied on surveys, primarily to investigate perceptions and attitudes (e.g. Fahimnia *et al*., 2019). Mathematical modeling has also been adopted to revise traditional optimization frameworks

by incorporating behavioral assumptions such as bounded rationality, non-standard preference structures, and heuristic-based decision making (Hämäläinen *et al*., 2013).

Notwithstanding the variety of domains examined and analytical perspectives employed in BO research, the field has largely remained anchored to individual-level and top-down framings. As highlighted in the introduction, this emphasis has generated rich and robust insights, while also leaving room for examining how emergent behavioral patterns unfold through interactions spanning roles, functions, and organizational layers (Molina-Azorín *et al*., 2020; Zhang and Gable, 2017; Farhan *et al*., 2023).

Against this background, the following sections review three core BO domains–inventory management, supply chain management, and productivity management–to delineate the contours of extant research. These domains are selected for two reasons. On the one hand, they represent the three most extensively studied areas of BO: according to the most recent review available at the time of writing (Cui *et al*., 2025), they account for approximately 22%, 20%, and 7% of BO studies, respectively, together comprising roughly half of the BO research produced to date. On the other hand, they reflect complementary dimensions through which BO scholars have typically investigated behavioral phenomena (e.g. Loch and Wu, 2007; Fahimnia *et al*., 2019; Donohue *et al*., 2020; Tokar, 2010; Bendoly *et al*., 2006). The inventory management domain captures the *decision-oriented* facet, focusing on how actors make operational choices and balance trade-offs. The productivity domain reflects the *practice- and execution-focused* facet, addressing how work activities are carried out and operational tasks are enacted on the shop floor. Finally, the buyer–supplier relationship domain represents the *relational and inter-organizational facet*, concerned with how firms coordinate, manage expectations, and govern exchanges across organizational boundaries.

### *2.1 Inventory management and the newsvendor problem*

Inventory management is one of the earliest and most extensively studied domains in BO, with a substantial body of work relying on the newsvendor problem as a controlled setting to examine how individuals make inventory decisions under uncertainty (Yamini, 2021, 2023; Perera *et al*., 2020). Specifically, the task requires a planner to commit to an order quantity given a known demand distribution and cost and revenue parameters, thereby facing a trade-off between the expected costs of overstocking and understocking (Becker-Peth and Thonemann, 2019; Zhang and Siemsen, 2019).

The appeal of the newsvendor problem lies in its analytical tractability and in the availability of a clear normative benchmark. However, despite this well-defined prescription, experimental evidence has consistently shown that actual behavior systematically departs from theoretical predictions. Schweitzer and Cachon (2000) were the first to document these deviations, most notably the pull-to-center effect (PTC), whereby individual decision makers tend to over-order in low-margin settings and under-order in high-margin ones. In doing this, they also evaluated multiple explanations for the phenomenon, showing that the PTC hinges on two behavioral mechanisms: anchoring with insufficient adjustment and an inventory-error minimization tendency aimed at avoiding large discrepancies between ordered and realized demand. Further studies have confirmed this pattern across multiple experimental designs and participant pools (Yamini, 2021, 2023; Donohue *et al*., 2019), consolidating it as a robust behavioral regularity.

Since this foundational evidence, subsequent work has approached the PTC effect from two complementary individual-centered angles. One focuses on how the decision problem is represented, asking whether such departures reflect differences from the standard expected-profit formulation rather than decision errors (Perera *et al*., 2020). Accordingly, scholars have modeled the newsvendor problem using functions that incorporate features like risk aversion and risk seeking (e.g. De Vericourt *et al*., 2013; Becker-Peth *et al*., 2018), loss aversion and reference dependence (e.g. Becker-Peth and Thonemann, 2016), Prospect Theory elements such as shifting reference points and probability weighting (Uppari and Hasija, 2019; Long

and Nasiry, 2015), mental accounting (Becker-Peth *et al*., 2013; Chen *et al*., 2013), ex post inventory-error costs (Bostian *et al*., 2008; Ho *et al*., 2010; Kremer *et al*., 2010), and impulse balance (Ockenfels and Selten, 2014, 2015). A second perspective examines the role of heuristics, decision biases, and underlying cognitive processes in driving ordering behavior away from the normative benchmark. This literature has documented, among others, the influence of framing effects (Tokar *et al*., 2016; Schultz *et al*., 2018), overprecision and overconfidence (Ren and Croson, 2013; Lee and Siemsen, 2017), bounded rationality (e.g. Su, 2008), demand chasing and mean anchoring (e.g. Bolton and Katok, 2008), and the individual differences in cognitive reflection that affect susceptibility to such biases (Moritz *et al*., 2013).

Building on these insights, scholars have proposed a range of strategies aimed at mitigating the PTC effect. Some studies shed light on learning dynamics, analyzing how repeated experience, round-by-round feedback, and knowledge of past demand can improve ordering behavior (e.g. Ockenfels and Selten, 2014; Bolton and Katok, 2008). Complementary work focuses on training interventions and decision aids–such as tutorials, explanatory materials, and graphical representations of the profit function–designed to enhance participants' understanding of the task prior to choice (e.g. Bolton *et al*., 2012). Other contributions develop decision-support tools like rule-based recommendations, which provide additional structure during the decision process (Benzion *et al*., 2008; Bostian *et al*., 2008). Finally, scholars also examine behavioral levers that reshape how individuals frame and engage with the ordering decision like task decomposition (Lee and Siemsen, 2017).

Moving beyond a strictly individual focus, a smaller subset of studies has introduced social and group-level decision settings. On the social side, evidence shows that even limited exposure to peers' decisions or opinions can systematically influence ordering behavior. For instance, concerns about relative performance may induce herding tendencies (Avcı *et al*., 2014), whereas repeated observation of others' choices can lead decision makers to progressively align their orders with those of a reference peer (Zheng *et al*., 2025). On the group side, studies such as Gavirneni and Xia (2009) and D'Urso *et al*. (2018) examine collective decision processes in which collective reasoning shapes the ordering outcome: pooling perspectives can reduce internal inconsistencies and improve coherence, yet collective decision making may also generate coordination frictions and misaligned expectations that are less salient at the individual level.

Although highly informative, both traditional formulations and more recent developments (e.g. distribution-free models, data-driven approaches) rely on what is typically referred to as the "*standard newsvendor setting*" (Becker-Peth and Thonemann, 2019; Perera *et al*., 2020); namely scenarios in which demand distribution and cost information are represented ex ante through a specified and commonly shared informational structure. Within this setting, key parameters are treated as given inputs to the decision problem, a choice that allows researchers to tightly control the experimental environment and, in turn, supports high internal validity and precise identification of cognitive mechanisms (Croson and Donohue, 2002; Croson, 2005).

This perspective, however, leaves room for further reflection on how the informational basis underlying inventory decisions takes shape. In organizational settings, it typically develops prior to the newsvendor choice through interdependent and ongoing exchanges: relevant signals originate from different organizational roles and priorities and are progressively brought together through coordination across functions, negotiation, and adjustments prompted by operational contingencies (Perera *et al*., 2020). As a result, the informational base underlying the ordering decision reflects the outcome of a bottom-up process through which dispersed inputs are aligned, interpreted, and rendered sufficiently coherent for planning purposes.

Importantly, recognizing the relevance of the informational base does not call into question the robustness of well-documented behavioral regularities in inventory decision making, nor the value of analyses that have established them. Rather, it points to a complementary direction for inquiry focused on how a coherent representation of the input data becomes available prior to choice. Differences in how smoothly or effortfully this informational backdrop emerges

may be associated with varying levels of interpretive effort or cognitive strain before an ordering decision is made, which may in turn influence the well-known behavioral tendencies of the planner (e.g. Yu *et al*., 2017). Viewed in this way, shedding light on how the informational basis preceding the ordering choice takes shape may complement existing knowledge on inventory management and help situate the study of inventory planning more closely within the organizational settings in which it typically occurs.

### *2.2 Supply chain management*

BO research in the SCM domain spans a wide range of empirical contexts, from system-level analyses that examine multi-echelon coordination (e.g. Beer Game) to localized investigations centered on buyer–supplier exchanges (Cui *et al*., 2025; Goudarzi *et al*., 2023; Schorsch *et al*., 2017). Due to space constraints, and given the illustrative purposes of our contribution, we focus on buyer–supplier exchanges, where BO research has mainly considered three closely related and sequential aspects: supplier selection, contract design, and ongoing cooperation.

In the selection stage, extant studies examine how buyers and suppliers evaluate potential partners and form initial expectations under uncertainty. While classical sourcing models portray selection as a structured comparison of price, quality, and delivery performance, evidence–largely from procurement auctions–documents systematic deviations from these prescriptions (Elmaghraby and Katok, 2019; Jap, 2007; Engelbrecht-Wiggans and Katok, 2007). On the buyer side, scholars have shown that judgments are shaped not only by suppliers' attributes *per se*, but also by bounded rationality and procedural constraints that affect how those attributes are evaluated. Rather than consistently applying formal scoring rules across multiple criteria, decision makers tend to narrow the choice set and simplify attribute trade-offs, assigning disproportionate importance to a limited number of salient dimensions (Elmaghraby and Katok, 2019). On the supplier side, experiments with sealed-bid auctions indicate more aggressive and inconsistent bidding than equilibrium models predict, reflecting regret aversion, noisy learning, and emotionally driven competitive responses (Morgan *et al*., 2003; Neugebauer and Selten, 2006; Engelbrecht-Wiggans and Katok, 2008; Quiroga *et al*., 2021). Similar deviations have been documented in non-auction settings, most notably in bilateral negotiations, where outcomes are shaped by interaction format and bargaining structure, leading to systematic differences in concession timing, magnitude, and willingness to revise initial positions (e.g. Chen and Wu, 2019). Beyond the procedural aspects, BO literature has examined how decision makers process informational cues exchanged prior to partner selection. Studies that manipulate the availability and credibility of such signals show that power and dependence shape the extent to which buyers attend to them, while reputation supports assessment of counterpart reliability even when objective information about non-price performance is incomplete (Bolton *et al*., 2013; Pulles *et al*., 2014; Beer *et al*., 2018).

Once a supplier has been selected, the relationship is formalized through contractual arrangements specifying prices, responsibilities, and risk allocation (Goudarzi *et al*., 2023). At this stage, BO research investigates how decision makers interpret and respond to contractual features that are theoretically equivalent under standard incentive models, showing that such arrangements often elicit systematically different choices (Bolton *et al*., 2023). For instance, works comparing schemes such as buyback and revenue-sharing contracts highlight that refund components are frequently perceived as potential losses rather than as risk-sharing solutions, often leading to lower order quantities under buybacks, in line with reference dependence and loss aversion (e.g. Cachon, 2003; Ho and Zhang, 2008; Zhang *et al*., 2016). Comparable behavioral asymmetries are observed across fixed-fee, quantity-discount, and two-part tariff structures, where differences in framing, rather than incentives *per se*, shape choices (Chen and Wu, 2019). In addition to framing effects, BO studies have shed light on the role of distributional concerns: when contractual terms are perceived as inequitable, parties may reject agreements or exert lower effort, even when standard incentive logic would predict

acceptance or high performance (Cui *et al*., 2007; Katok and Pavlov, 2013). Extant contributions have further analyzed the implications of contract complexity. In particular, although multidimensional contracts are designed to induce truthful revelation, evidence shows that decision makers frequently misinterpret contingent clauses, overlook dominated options, or simplify complex structures through heuristics, thereby weakening the contracts' intended properties (Kalkanci *et al*., 2011). Complementing this focus on formal agreements, scholars have considered implicit and unenforceable expectations–commonly referred to as psychological contracts–pointing out their role in influencing parties' behavior alongside written conditions (Hill *et al*., 2009; Eckerd *et al*., 2013).

After terms are set, the buyer–supplier relationship enters a third stage–ongoing cooperation–characterized by repeated operational interactions. In this stream, a substantial body of work examines how buyers and suppliers behave when exchanging information that is relevant to operational planning (Özer and Zheng, 2019; Cui *et al*., 2025). A central insight is that information sharing behavior systematically departs from the predictions of standard cheap-talk models, which assume such messages should be entirely ignored when incentives are misaligned (e.g. Inderfurth *et al*., 2013). For instance, studies on forecast sharing show that buyers tend to strategically inflate the signals they provide, yet avoid extreme exaggeration, while suppliers discount shared forecasts without treating them as either fully informative or uninformative (e.g. Özer *et al*., 2011, 2014, 2018). These dynamics are further conditioned by expectations regarding the counterpart's reliability (Bonatto *et al*., 2020): when such expectations are favorable, information sharing becomes more accurate and less strategically distorted; when concerns about opportunism dominate, information is withheld or reshaped, creating frictions and misalignments. To conclude, research on ongoing cooperation has highlighted the role of informal communication cues (e.g. handshakes) in operational alignment, showing that they enhance perceptions of goodwill and foster expectations of reciprocity (Loch and Wu, 2008).

Across these three stages, buyer–supplier exchanges are consistently shaped by trust–either directly or through closely related antecedents–defined as the expectation that the other party can be relied upon under conditions of uncertainty and interdependence. In supplier selection, trust operates primarily in an ex-ante and inferential form: since direct relational experience is absent, buyers rely on reputation and observable signals to assess a supplier's trustworthiness and to filter uncertainty. Here, trust-related expectations influence how decision makers trade off potential efficiency gains or cost savings against perceived risk, shaping the willingness to engage with less familiar partners. During contracting, trust interacts closely with the interpretation of formal agreements by conditioning how incomplete or ambiguous clauses are interpreted and enacted in practice. In ongoing cooperation, trust becomes increasingly consequential for day-to-day coordination. Through repeated interaction, trust-related expectations are continuously reinforced or adjusted, shaping how shared information is interpreted, how much strategic distortion is tolerated, and how actors respond to disruptions or misalignments.

Importantly, extant research has largely examined trust within well-defined decision settings, typically operational tasks involving individual actors or pairs, where temporal dynamics are captured through repeated executions of the same task. This focus has proven highly effective in illuminating how trust shapes behavior under uncertainty and how actors adapt their decisions over successive rounds. At the same time, it directs analytical attention toward the formation and evolution of trust within a single, specific task. As a result, BO has provided a detailed understanding of how trust develops among the actors involved in that task, while offering comparatively less evidence of how trust formed at one specific interface carries over to others, or how localized interaction histories shape coordination at the level of the buyer–supplier relationship as a whole.

A promising direction for future BO research therefore lies in examining how trust emerges from multiple situated interactions involving different boundary-spanning actors and consolidates into a higher-order relational property at the buyer–supplier relationship level.

This perspective entails studying how repeated exchanges at different boundary interfaces become focal points of reliance, progressively reshaping coordination beyond the specific tasks in which they originate. Exploring these dynamics would allow BO research to complement existing insights with a richer understanding of how trust stabilizes–or unravels–over time, which boundary interfaces exert greater influence, and to clarify the fragility of buyer-supplier collaboration in real-world settings, where localized disruptions at critical interfaces can reverberate across the entire buyer–supplier relationship.

*2.3 Productivity management*

The last stream we consider is productivity. In this domain, BO research has primarily developed along two main lines of inquiry (Fahimnia *et al*., 2019; Allon and Kremer, 2018): workers' behavioral adjustments during task execution, and managerial interventions aimed at improving performance.

Starting with workers' behavioral adjustments, a central focus concerns execution speed. On the one hand, scholars shed light on how workers regulate their pace when operating in interdependent production systems. Evidence shows that pace regulation reflects adaptations to the operating rate of colleagues on the line and observable downstream congestion and idle time: slower workers tend to accelerate, while faster workers moderate their speed. These individual adjustments foster greater temporal alignment across interdependent tasks and limit blocking and starvation effects at the various processing steps (Schultz *et al*., 1998, 1999; Mas and Moretti, 2009). On the other hand, BO research has also provided extensive evidence on the role of workload pressure as a key driver of execution speed. This stream highlights non-linear responses to pressure, whereby workers may temporarily increase speed under moderate load, while sustained overload constrains continued adaptation due to cognitive fatigue and attentional depletion (e.g. Aral *et al*., 2012; Bendoly and Prietula, 2008). As pressure intensifies, behavioral adjustment extends beyond pace regulation to how tasks are executed, with workers simplifying procedures, reducing discretionary activities, or relying on workarounds (Oliva and Sterman, 2001; Morrison, 2015; Glock *et al*., 2017). These execution-level adjustments may distort managerial learning, since apparent productivity gains mask underlying overload and contribute to the persistence of understaffing (Oliva, 2001). The last dimension related to behavioral adjustments concerns task selection, that is, how workers choose which tasks to prioritize. By relying on settings with multiple concurrent demands, BO research has investigated how task prioritization departs from purely efficiency-based logics. In particular, when tasks differ in complexity or signaling value, reputational and self-image concerns lead workers to favor activities that convey competence or engagement, or to resort to multitasking to appear responsive (Katok and Siemsen, 2011; Kc, 2014). This imposes cognitive switching costs that fragment attention and slow task execution, ultimately lowering productivity (Allon and Kremer, 2018). Importantly, across these settings, scholars consistently show that behavioral patterns vary depending on workers characteristics such as skills, experience, learning trajectories, and the capacity to sustain effort (Bendoly and Prietula, 2008; Schultz *et al*., 2010).

Moving to studies on productivity improvement, research has devoted substantial attention to the role of incentives. Much of this work relies on piece-rate pay as a baseline setting to examine how they influence productivity through changes in individual effort and sorting effects (Lazear, 2000; Shearer, 2004). In doing so, BO emphasizes that incentive effects depend on the social and task environment: work on relative and team-based schemes shows how interpersonal ties, fairness concerns, and social pressure shape effort responses, and how schemes that are theoretically efficient may suppress effort when they foster collusion or norm-driven restraint, particularly in socially dense settings (Bandiera *et al*., 2005, 2013). The effectiveness of incentives further varies depending on how they are framed and communicated, with loss-framed bonuses eliciting stronger responses than equivalent gain-framed incentives, consistent with loss aversion rather than differences in economic payoffs

(Hossain and List, 2012). Beyond economic incentives, a distinct line of research examines the role of non-economic ones in shaping individual effort allocation, shedding light, among others, on the role of status cues, public recognition, and relative performance feedback (Greenberg, 1988; Blanes i Vidal and Nossol, 2011).

To conclude, BO research has investigated productivity improvement approaches based on structured techniques such as lean production, Six Sigma, and Total Quality Management. Within this stream, scholars examine how they affect productivity by shaping workers' behavior; that is how they direct attention, encourage engagement, and influence how operational problems are framed, interpreted, and addressed on the shop floor (e.g. Galeazzo *et al*., 2024; Saabye *et al*., 2023; Furlan *et al*., 2019; Hozak and Olsen, 2015). In parallel, and in line with core BO tradition, scholars also shed light on how bounded rationality shapes individuals' responses to such systems. For instance, work on capability traps shows how short-term performance pressure can systematically redirect attention away from process improvement toward immediate production fixes, as delays, attribution biases, and limited foresight distort learning and decision making, ultimately undermining longer-term improvement capability development (Repenning and Sterman, 2002). Complementing this view, BO research examines the conditions that facilitate the effective adoption and enactment of these productivity-improvement techniques. In this stream, scholars analyze how specific design elements–such as performance targets and formal goals–shape individuals engagement with improvement initiatives (e.g. Linderman *et al*., 2006). Related work further investigates how structured improvement techniques are implemented alongside practices that support coordination and learning, as opposed to more compliance-oriented designs, and how these choices influence attention allocation and improvement behavior on the shop floor (e.g. Januszek *et al*., 2023). Finally, BO research highlights the role of empowerment and feedback in shaping how productivity-improvement systems are enacted in daily operations, and in determining whether they foster disciplined problem solving or devolve into superficial compliance (e.g. Netland *et al*., 2015).

As the preceding discussion shows, BO research on productivity improvement has developed a rich and influential body of insights into how managerial interventions shape behavior on the shop floor. This literature has been highly effective in uncovering the behavioral mechanisms through which formal systems influence attention, effort, and problem framing, as well as in explaining why productivity-oriented interventions that are theoretically well designed may nonetheless fail to deliver expected results. In doing this, much of this work has approached productivity improvement from a top-down perspective, conceptualizing improvement practices as formal design choices and directing analytical attention toward how individual workers respond to the prescriptions they introduce.

On the contrary, comparatively less is known about how day-to-day use of formally introduced improvement practices is coordinated and combined by shop-floor workers, ultimately shaping productivity at the group level. Addressing this gap is especially important because it brings analysis closer to how improvement efforts actually unfold. In operational settings, productivity gains rarely result from isolated individual responses or their simple additive aggregation. Rather, it develops through repeated interaction among shop-floor actors, as individuals operate in interdependent settings, adjust their actions with others, and contribute in different but complementary ways; for instance, by identifying problems, proposing solutions, aligning actions, and sustaining initiatives over time.

Building on these insights, a promising direction for future research lies therefore in extending the analytical focus beyond individual responses. More specifically, this involves examining the bottom-up processes through which individual contributions are combined in everyday operations, giving rise to collective patterns of improvement. Attending to these dynamics can help explain why similar productivity outcomes may rest on different underlying interaction dynamics, with important implications for the robustness and persistence of improvement efforts over time.

## 3. Multilevel theory

The previous sections have shown that, while BO has made substantial progress in uncovering systematic deviations from rationality and in advancing understanding of how operational actors think and decide, much of this work has relied on micro-level or top-down explanations. This perspective leaves room to further explore how individual judgments, decisions, and contributions combine into collective patterns (Kozlowski and Chao, 2012; Kuljanin *et al*., 2024). Advancing this line of inquiry requires examining how behavior is shaped by the dynamic multilevel processes through which localized actions and interactions consolidate into higher-order outcomes. In other words, moving forward calls for a broader conceptual foundation that expands the analytical lens from individuals to interactions, from isolated deviations to evolving dynamics, and from static outcomes to ongoing processes (Drazin *et al*., 1999; Kozlowski and Klein, 2000).

At the core of this effort lies the adoption of an emergent multilevel lens that, drawing on general systems theory and complexity science, conceives organizations as hierarchically nested yet dynamically adaptive systems (Klein *et al*., 1994; Giannoccaro, 2013; Mathieu and Chen, 2011). This perspective follows a longstanding tradition in the social sciences, according to which higher-level arrangements shape lower-level processes, while local interactions, in turn, influence broader patterns (House *et al*., 1995; Johns, 2006; Lemoine *et al*., 2026). In other words, these levels are not passive containers but active structures of influence, constraint, and adaptation. Kozlowski *et al*. (2013) identify three defining features of emergent phenomena:

(1) *Multilevel origin* refers to their structural nature, which inherently spans at least two distinct levels of analysis: a lower level where the phenomenon originates and a higher level at which the collective property manifests. The central premise is that higher-level constructs (e.g. team climate, performance) are anchored in the attributes and states of the actors who compose it, reflecting patterned configurations rather than simple aggregates. In this view, emergence defines a hierarchical linkage between levels, connecting micro-level foundations to macro-level manifestations (Kozlowski and Klein, 2000).

(2) *Process orientation* emphasizes the dynamic interplay by which individuals coordinate, negotiate, and adapt to one another within interdependent systems: it highlights how interactions gradually transform dispersed actions and decisions into higher-order regularities. These dynamics unfold due to what Morgeson and Hofmann (1999) describe as "*ongoings, events, and event cycles*", namely repeated sequences of interaction that stabilize into recognizable collective patterns. Through such recurring exchanges, individuals develop shared expectations, interpretive frames, and coordination habits that shape subsequent behavior (Drazin *et al*., 1999). Process orientation thus shifts the analytical focus from static outcomes to understanding how dispersed individual actions coalesce into coherent collective functioning.

(3) *Temporal sensitivity* recognizes that emergent phenomena take time to manifest at higher levels. The formation of collective properties is rarely instantaneous: it unfolds gradually as individual-level behaviors and interactions accumulate and align (Kozlowski and Klein, 2000). The duration of this process varies depending on the involved dynamics. Some forms of emergence, such as shared situational awareness, can occur within brief episodes of interaction, while others–like collective identity or organizational culture–require prolonged periods of recurring exchange and reinforcement. What matters is that the higher-level property does not exist *a priori*; it becomes observable only through this temporally distributed process.

From this perspective, macro-level constructs such as team climate or performance are best understood as higher-order outcomes that take shape over time from interdependence among

actors with patterns that evolve, stabilize, and sometimes transform as interactions unfold (Morgeson and Hofmann, 1999; Grand *et al*., 2016). Importantly, emergence essentially operates through two underlying mechanisms, depending on whether interdependence among members is rooted in shared similarities or in differentiated, complementary roles (DeChurch and Mesmer-Magnus, 2010; Chan, 1998):

(1) *Compositional emergence* occurs when higher-level properties are isomorphic with those of individual units. Aggregation is typically linear or additive, such as through means or sums. For example, team climate can be viewed as the result of summarizing individual perceptions or affective states. In such cases, the emergent property closely resembles its components, and the collective construct directly reflects lower-level attributes.

(2) *Compilational emergence* arises when higher-level properties reflect the integration of distinct, interdependent, and complementary contributions, rather than mirroring individual characteristics. The emergent property is not reducible to any single component but results from their dynamic interplay. For instance, team performance may stem from how members contribute diverse skills, enact different roles, and coordinate in real time. No single input explains the outcome; it is the configuration and interaction of these elements that gives rise to a qualitatively novel collective capability.

This distinction is crucial in multilevel theorizing as it informs both the design of measurement models and the interpretation of cross-level relationships (see Kozlowski *et al*., 2013; Kozlowski and Chao, 2012 for a more detailed discussion on the topic). However, recognizing these mechanisms does not mean that emergence develops in a uniform or predictable way. The formation of collective patterns is inherently variable and often unfolds along nonlinear trajectories as exchanges accumulate. Depending on the interplay of factors such as local interactions, feedback processes, and underlying conditions, collective patterns may either converge toward similar higher-order states or diverge into distinct configurations. This logic aligns with the open-systems principles of equifinality and multifinality (von Bertalanffy, 1968; Katz and Kahn, 1978; Cronin *et al*., 2011):

(1) *Equifinality* denotes that distinct emergent configurations can yield comparable macro-level outcomes. This means that fundamentally different patterns of localized actions can converge toward the same higher-order collective property or performance result. For example, two teams may achieve similar levels of performance through divergent behavioral configurations and temporal sequencing.

(2) *Multifinality*, conversely, implies that similar initial conditions can evolve toward divergent macro-level end states. For instance, two teams starting with comparable resources and composition may evolve into drastically different organizational states: one may develop a robust climate of psychological safety, while the other becomes characterized by high conflict and low collective efficacy, due to subtle differences in interaction patterns, temporal pacing, and adaptive responses over time.

From this standpoint, organizations can be understood as emergent systems in which structure, adaptation, and performance continually arise from–and recursively feed back into–the patterned interactions among their members (Morgeson and Hofmann, 1999; Kozlowski, 2022; Kuljanin *et al*., 2024). An emergent multilevel perspective thus offers a powerful lens for analyzing how behavior takes shape and evolves across organizational roles, layers, and temporal phases (Molina-Azorín *et al*., 2020). It helps illuminate phenomena that so far have received little attention, like the progressive stabilization of practices and procedures, the stratified nature of coordination, and the layered alignment of expectations across interdependent roles (Moliterno and Mahony, 2011; Grand *et al*., 2016).

Far from being an abstract exercise, the complexity of multilevel theorizing yields several practical insights for BO research, allowing for a better understanding of how individual actions and interactions combine to produce higher-level patterns and revealing the mechanisms that sustain or hinder integration across organizational levels (Carraro *et al.*, 2025; Hackman, 2003; Hitt *et al.*, 2007). This can enable BO scholars to broaden their analytical focus, viewing behavior as a dynamic and ongoing process of construction, alignment, and transformation (Kuljanin *et al.*, 2024; Hernaus *et al.*, 2024). Moreover, a multilevel lens helps clarify the connections between individual actions and collective outcomes; illustrating, for instance, how local judgments and interactions translate into broader operational patterns and performance results, while also showing how actions that appear individually initiated are shaped by shared expectations and mutual influence (Lemoine *et al.*, 2026; Zhang and Gable, 2017). By illuminating these interdependencies, multilevel theorizing extends BO toward a richer understanding of the emergent dynamics that underpin OM-related practices and performance.

Informed by prior reviews and conceptual contributions (e.g. Bendoly *et al.*, 2006; Gino and Pisano, 2008; Croson *et al.*, 2013; Donohue *et al.*, 2019, 2020; Fahimnia *et al.*, 2019; Cui *et al.*, 2025), Table 1 outlines several domains that offer promising avenues for emergent multilevel theorizing. The aim is not to provide an exhaustive mapping of the field, but rather to show how emergent dynamics may unfold across a wide range of operational areas, from well-established settings such as the traditional newsvendor problem to more recent streams like product recall. To further elaborate this perspective, the following sections revisit the three foundational domains introduced earlier and reconsider them through an emergent lens.

## 4. What a multilevel lens could help reveal: reframing core domains as emergent phenomena

### *4.1 Inventory management and the newsvendor problem: the role of information availability*

Inventory management has often served as a key setting for BO research (Schweitzer and Cachon, 2000). As discussed in Section 2.1, extant contributions have documented robust behavioral regularities (the pull-to-center effect) as well as informed the development of interventions and decision-support tools aimed at mitigating systematic deviations from normative prescriptions (Bolton and Katok, 2008; Lurie and Swaminathan, 2009). While essential for establishing relevant micro-level insights into how decision makers process uncertainty and trade-offs, this body of work has devoted comparatively less attention to how the informational input itself is constituted through interdependencies, asymmetries, and coordination processes.

In practice, inventory planning typically involves multiple functions, each contributing different informational fragments, facing specific constraints, and engaging in repeated interactions (Costantino *et al.*, 2015). Over time, these cross-functional inputs form a shared knowledge base: a group-level construct shaped by recurring patterns of disclosure, interpretation, and accessibility (Stasser, 1992; Kozlowski and Chao, 2012). While the planner, with his/her biases, retains formal responsibility for the final decision, this knowledge base delineates the informational environment in which it is taken. In particular, the way information is shared, understood, and integrated influences the scope, quality, and alignment of available inputs, thereby shaping the decision setting and the effort required to build and maintain it (e.g. Colicchia *et al.*, 2019).

To illustrate this aspect, consider a planning context in which functions operate under distinct performance metrics and accountability pressures — sales measured on service levels, procurement on cost containment, logistics on inventory efficiency — while having only limited visibility into each other's informational needs and no shared mechanisms for cross-functional reconciliation. From this common point of departure, two contrasting trajectories can unfold depending on how repeated interaction develops over time, in line with the principle of multifinality introduced in Section 3.

**Table 1.** Overview of emergent dynamics across key domains in BO

| Topic | Multilevel origin | Process orientation | Temporal sensitivity | Exemplary references |
|---|---|---|---|---|
| Inventory management (newsvendor problem) | Inputs contributed by different functions (e.g. sales, procurement, finance, logistics) collectively shape the informational base on which inventory decisions are made | The informational base is built through repeated cross-functional exchanges in which actors disclose, interpret, and integrate their respective inputs | Across successive planning cycles, stable patterns of disclosure and coordination emerge, gradually shaping the recurring informational landscape in which inventory decisions are made | Schweitzer and Cachon (2000), Gavirneni and Xia (2009), Oh *et al.* (2024) |
| Forecasting and forecast consensus in S&OP | Individual forecasts align through negotiation to yield team-level consensus plans | Consensus emerges through interactive negotiation and reconciliation of forecast inputs | Consensus formation progresses over multiple planning cycles, involving repeated exchanges and continual refinement of perspectives | Oliva and Watson (2011), Tuomikangas and Kaipia (2014), Stentoft *et al.* (2021) |
| Project management | Decisions made by individuals (e.g. task sequencing, risk tolerance, role boundaries) shape how teams coordinate and deliver project outcomes | Coordination forms through continuous engagement, integration of diverse perspectives, and mutual adjustment among project stakeholders | Coordination matures over the project duration, shaped by emergent challenges and critical decision points where significant choices are made | Bendoly and Swink (2007), Schoenner *et al.* (2017), Flyvbjerg (2021) |
| Buyer-supplier relationships | Behaviors and perceptions of boundary-spanning actors (e.g. buyers, technical contacts) influence alignment and trust formation at the inter-organizational relationship level | Trust unfolds through ongoing communication, reciprocal adaptation, and the reconciliation of expectations across organizational boundaries | Relational dynamics consolidate gradually with accumulated interactions affecting how trust develops and how roles, responsibilities, and expectations are interpreted and adjusted over time | Özer *et al.* (2018), Elmaghraby and Katok (2019), Goudarzi *et al.* (2023) |
| Productivity improvement | Individual problem-solving and improvement behaviors interact to give rise to team-level improvement capabilities | Improvement capabilities develop through peer interaction, shared use of tools, and alignment around operational issues | Improvement capabilities stabilize over time through repeated practice and mutual adjustment | Bandiera *et al.* (2013), Furlan *et al.* (2019), Galeazzo *et al.* (2024) |

(*continued*)

**Table 1.** Continued

| Topic | Multilevel origin | Process orientation | Temporal sensitivity | Exemplary references |
|---|---|---|---|---|
| Product recall | Individual assessments of product-related anomalies (e.g. defects, complaints, safety signals) shape how recall issues are understood at the cross-functional level | Interpretations of anomaly signals are refined through iterative exchanges among actors from different areas (e.g. quality, operations, legal), as they confront divergent assessments and negotiate how the issue should be understood | As successive rounds of evaluation unfold, interaction patterns among involved functions gradually consolidate, shaping how anomaly signals are interpreted collectively and how differing risk perceptions converge toward a shared understanding of the issue | Ball *et al*. (2018), Mukherjee and Sinha (2018), Wowak *et al.* (2022) |
| New product development | Interactions among members with different attitudes (e.g. risk perception, autonomy) determine how they contribute to innovation processes, ultimately influencing team performance and the success of product development initiatives | Innovation unfolds through ongoing negotiation, knowledge exchange, and coordination among diverse stakeholders managing uncertainty and competing priorities | The new product development process evolves over time, influenced by arising uncertainties and cumulative learning from iterative cycles | vanBurg and vanOorschot (2013), Chen *et al*. (2015), Trott *et al*. (2024) |
| Load management and capacity utilization | Individual perceptions of workload and operational pressure (e.g. occupancy, accumulation, urgency cues) shape pacing and coordination behaviors among workers, giving rise to effective capacity availability at the unit level | Effective capacity availability emerges through interaction among workers, as individual pacing adjustments, coordination choices, and mutual responses to others' behavior combine at the unit level | Across successive work cycles, repeated interaction and mutual adjustment among workers gradually shape shared expectations about pacing and coordination, stabilizing how effective capacity is enacted | Kc and Terwiesch (2009), Batt and Terwiesch (2017), Cantor and Jin (2019) |

**Source(s):** Authors' own elaboration

In Case 1, an early planning meeting in which each function clarifies its informational requirements initiates a path toward progressive alignment. Across successive planning cycles, disclosures gradually become attuned to the various needs and expectations: sales learns which demand signals procurement can act on and adjusts its inputs accordingly; procurement, reading how logistics interprets cost thresholds, calibrates its reporting to make trade-offs more clear; logistics, in turn, specifies holding cost escalations in terms that give the other functions a concrete basis for evaluating overstocking risk. Over time, a shared

understanding of what every function is expected to provide consolidates into a recurring structure of coordinated disclosure (Turkulainen and Ketokivi, 2012). Importantly, once formed, this structure is sustained by the accumulated history of cross-functional exchanges rather than by individual agency (e.g. newcomers entering any function would encounter established expectations and likely adapt to them) (Kozlowski and Klein, 2000). Given the coherence and intelligibility of the various contributions, the higher-level construct reflects the convergence of perspectives without requiring substantial reinterpretation or reconciliation (Kozlowski *et al*., 2013). This leads to a compositional informational base where the collective understanding relevant to the planner's decision derives from the direct aggregation of aligned functional inputs, minimizing ambiguity and reducing the need to reconcile discrepancies (Sahin and Robinson, 2002). As a result, coordination is streamlined, trade-offs are explicitly discussed across functions, and planning decisions can be made with less cognitive effort (Jeong and Leon, 2012).

In Case 2, an early planning meeting in which misunderstandings about informational needs go unaddressed initiates a path toward fragmentation. Over successive cycles, each function adapts to a deteriorating context: sales inflates projections because its inputs have historically been adjusted without explanation; logistics, receiving signals it can no longer treat as reliable, aggregates its cost reporting in ways that further reduce the visibility of trade-offs; procurement, finding both signals too noisy to interpret, narrows its horizon to short-term sourcing conditions. In other words, each of these responses reshapes the conditions to which the others then adapt, generating a self-reinforcing circuit of mutual opacity. The available information therefore remains decontextualized and poorly integrated; cross-functional exchanges are weak, leaving the planner to stitch together disparate inputs under cognitive strain. In this context, the informational foundation of the decision does not result from the straightforward aggregation of functional contributions, but must be actively constructed through the reconciliation of misaligned viewpoints (Kocabıyıkoğlu *et al*., 2024). Again, once in place, this opaque structure is self-sustaining and even more transparent individual disclosures would tend to be absorbed without altering the prevailing dynamic (Morgeson and Hofmann, 1999). This exemplifies a case of compilational emergence, in which collective understanding arises from incomplete and disjointed functional viewpoints (Kozlowski and Klein, 2000), resulting in strained coordination, conflicting trade-offs, and greater interpretive effort in reaching consistent decisions (Lee and Siemsen, 2017).

Taken together, these two examples illustrate that the effectiveness of inventory planning does not rest solely on the planner's cognitive capability, which — together with the well-documented individual biases — remains a central determinant of ordering behavior. Rather, they suggest that planning outcomes might also be shaped by how information is collectively structured and made accessible through interactional patterns that selectively privilege certain informational inputs while rendering others less visible or interpretable (Stasser, 1992). From this perspective, informational structures are not predefined or centrally imposed; they emerge from cross-functional exchanges that shape how inputs are disclosed, interpreted, and integrated (Colicchia *et al*., 2019).

Inventory planning, in this view, could be understood as a multilevel process in which coordination and sensemaking unfold through interaction (Kozlowski *et al*., 2013). When these processes enable alignment across roles and functions, they help stabilize the informational context in which ordering choices are formed; when they consolidate around misalignment, they give rise to a structural pattern that persists independently of individual intentions and shapes the conditions under which subsequent planning decisions are made.

### *4.2 Buyer–supplier relationships: the role of trust*

Behavioral research on buyer–supplier relationships has traditionally focused on trust formation and evolution within specific tasks (see Section 2.2), typically examining it at the level of a single buyer–supplier interface and as the local outcome of repeated interactions.

This line of work has been central to establishing robust insights into how trust shapes supply-related decisions and coordination under uncertainty. At the same time, it has emphasized a micro-level perspective, with analytical attention directed toward specific exchanges.

In practice, trust is better understood as a dynamic relational property that emerges from the behavior of multiple individuals occupying critical boundary roles–such as buyers, sellers, technical liaisons, or account managers–who operate at the interface between firms and are responsible for coordination and communication across organizational boundaries (Shamsollahi *et al*., 2021; Ireland and Webb, 2007). Through their conduct, responsiveness, and credibility across interaction episods these actors shape how the relationship is experienced, interpreted, and sustained over time, each contributing in a specific and situated manner to the formation of trust at the whole buyer-supplier relationship level (e.g. Shamsollahi *et al*., 2021).

To illustrate these aspects, consider two contrasting examples. In Case 1, a relationship between a manufacturer and a strategic supplier starts under uncertainty. Coordination is inconsistent, and several interfaces characterized by repeated exchanges operate with limited clarity on aspects like information accuracy and response expectations. Over time, a senior technical point of contact on the supplier side begins to stand out through small but consistent contributions, resolving misalignments, anticipating bottlenecks, and communicating transparently across functions. These actions are not formally mandated, but gradually become recognized and relied upon by other actors, ultimately influencing coordination patterns well beyond the liaison's immediate role. As confidence in this individual grows, people involved in the buyer-supplier relationship start to adjust their practices accordingly: escalation paths are informally rerouted, cross-functional questions are directed to this person, and the inputs of this actor shape coordination across units. Trust, in this case, emerges from the accumulation of locally meaningful interactions involving multiple actors occupying different interface roles, yet it gradually becomes centered on the conduct of a single focal role whose behavior proves especially visible, reliable, and consequential for coordination. In other words, what stabilizes at the system level is not a uniformly shared perception of reliability across all interactions, but one anchored to a single credible individual whose conduct comes to disproportionately shape how the relationship is experienced and sustained.

In Case 2, a comparable supply relationship begins smoothly: procurement is responsive, logistics is aligned, and planning proceeds without friction, reflecting an initially high level of trust. At some point, however, problems arise at a critical interface between the buyer's and supplier's engineering teams. A specification mismatch flagged by the buyer is downplayed by the supplier's technical contact, requests for clarification go unanswered, and a subsequent escalation is misrouted and left unresolved. At first, the disruption appears minor and contained, but its effects gradually ripple outward. Engineering teams lose confidence in informal exchanges and shift toward greater reliance on written documentation. Meetings become more procedural, approvals take longer, planning departments introduce buffers to hedge against delays, and procurement adopts a more cautious stance. Although most interfaces continue to function reliably, a subtle but persistent sense of friction affects the broader relationship. Trust, in this case, does not erode because of system-wide failure, but through the gradual accumulation of concern centered on a single point of friction. As this misalignment persists, the broader relationship becomes increasingly conditioned by the fragility of that critical role, rather than reinforced by the reliability observed elsewhere.

As we have seen, trust at the level of the buyer–supplier relationship takes shape through situated interactions across multiple relevant interfaces, each contributing in a differentiated way (Hill *et al*., 2009; Gullet *et al*., 2009). In the first case, trust consolidates around a consistently reliable actor, whose proactive conduct and responsiveness gradually shape expectations, influence coordination, and foster alignment across functions. In the second, trust erodes not because of systemic failure, but due to the persistent dysfunction of a single critical interface, whose unreliability generates interpretive strain and fosters defensive behavior through the wider relationship. Both these examples reflect a form of compilational

emergence where system-level outcomes are shaped by the uneven distribution of credibility, visibility, and responsiveness across roles. Viewing buyer–supplier trust through this lens draws attention to the various points of critical influence (Kozlowski and Klein, 2000). It also underscores the temporal fragility of trust, highlighting that although confidence may build gradually through repeated interaction, it can be quickly destabilized by the failure of a single critical role (Kozlowski *et al*., 2013). From this perspective, trust represents a relational outcome shaped over time by the conduct of boundary actors: it emerges unevenly, consolidates selectively, and may falter when localized expectations are disappointed.

*4.3 Productivity management: improvement on the shop floor*

As discussed in Section 2.3, BO research has devoted substantial attention to efforts aimed at improving productivity. Within this stream, such approaches are often portrayed as top-down managerial initiatives, in which standardized practices and formal design features are defined to guide individual behavior. A complementary and potentially informative perspective is to view productivity improvement as an outcome that is enacted and gradually stabilizes over time through day-to-day interactions, local adjustments, and coordination among operational actors.

To understand these aspects, consider two production teams in which lean tools (e.g. daily huddles, shopfloor management, kaizen boards) have been formally introduced. While these instruments provide a common structure, their use depends on the extent to which the members of the teams take initiative to identify, communicate, and act on improvement opportunities (e.g. Grant and Ashford, 2008). This process is not driven by top-down enforcement, but by local interactions, reciprocal influence, and shared understandings of issues and priorities (e.g. Carraro *et al*., 2025).

For instance, in Team 1, one operator consistently takes the lead in identifying inefficiencies, proposing refinements, and encouraging colleagues to act: the operator frequently raises recurring bottlenecks during huddles, suggests layout modifications to reduce motion waste, and prompts peers to share their observations. Though not formally assigned, these behaviors gradually become recognized and relied upon within the team. Supervisors begin to consult the operator more frequently, and colleagues increasingly draw on this person's input to prioritize actions. Over time, a configuration emerges in which the team appears collectively devoted to productivity improvement. Yet this emergent property does not stem from uniform engagement across members. Rather, it is disproportionately shaped by the initiative of one individual, whose actions gradually influence both peer behaviors and managerial attention.

In Team 2, behaviors aimed at improving productivity are more evenly distributed across members, each contributing in a distinct yet complementary way. One operator tracks recurring quality issues and summarizes them weekly for the group. Another updates the performance board daily and initiates informal exchanges to align efforts around short-term bottlenecks. A third monitors upstream supply conditions and regularly alerts the team about potential disruptions. Others gradually take on responsibilities like coordinating with maintenance, suggesting adjustments to work sequences, or facilitating communication with adjacent shifts. These actions are neither formally assigned nor uniformly performed. Over time, a configuration emerges in which team-level improvement behavior arises from the structured interplay of differentiated contributions. Each member brings specific insights or actions that, together, sustain the team's engagement in continuous improvement.

Though both teams represent cases of compilational emergence–where team-level behavior related to productivity improvement stems from the integration of differentiated and interdependent behaviors rather than simple aggregation–they follow different developmental paths (Kozlowski and Klein, 2000; Kozlowski *et al*., 2013), in line with the principle of equifinality. In Team 1, the process is driven by one highly proactive individual who gradually influences peers and supervisors. In Team 2, initiative is more evenly

distributed, with members contributing in complementary ways. As noted by Galeazzo *et al.* (2021), the distribution of participation is not fixed but may vary across teams and contexts (e.g. in less mature settings a particularly proactive individual may catalyze engagement, whereas in more developed teams improvement efforts often rely on distributed initiative and mutual reinforcement). Even under similar structural conditions, teams can therefore develop different coordination patterns.

Understanding productivity improvement through an emergent lens therefore brings attention to how improvement techniques and systems operate in practice: this perspective highlights how they are enacted, sustained, and sometimes reshaped through patterns of interaction, local adjustment, and coordination. From this viewpoint, productivity improvement on the shop floor reflects not only the presence of standardized tools or top-down prescriptions, but also the interactional processes through which shared understandings, initiative, and coordination gradually take form and stabilize over time.

## 5. Extending BO through a multilevel lens

As illustrated in the preceding sections, an emergent multilevel lens offers a promising avenue to broaden the boundaries of BO research, showing how individual behaviors, through interaction and interdependence, progressively consolidate into collective patterns. Building on prior methodological contributions on multilevel theorizing (e.g. Kozlowski and Chao, 2012; Kozlowski *et al*., 2013; Marks *et al*., 2001; Cronin *et al*., 2011; Zhang and Gable, 2017; Hernaus *et al*., 2024), translating this perspective into actionable research designs requires considering three complementary aspects. The first involves clarifying how behavioral phenomena take shape and are distributed across levels. The second concerns reframing outcomes and research questions to illuminate how situated behaviors consolidate into the higher-level patterns. The third entails aligning methodological and sampling choices with the interactional and layered nature of these dynamics. These aspects are summarized in Table 2 and described in more detail below.

### *5.1 Clarifying the multilevel architecture of emergence*

Providing a clear account of how a BO phenomenon spans different levels of analysis is the first step in applying an emergent multilevel perspective. This requires specifying the level at which the underlying inputs originate, the level at which the corresponding collective properties manifest, and the mechanism through which the two are linked (Kozlowski and Klein, 2000). A careful consideration of these issues is crucial for determining what should be theorized at the micro level, what constitutes a genuinely collective property, and how the two relate to one another in giving rise to the observed phenomenon.

For what concerns the level at which the relevant behavioral inputs originate, the point of departure naturally lies in the situated actions and interpretations of individuals (Carraro *et al*., 2025; Molina-Azorín *et al*., 2020). These micro-level contributions constitute the building blocks from which more complex patterns can later emerge, as they embody how people engage with their tasks and respond to the conditions of their immediate work environment. Making this foundation explicit anchors the phenomenon in its elemental components and helps identify where meaningful variation initially resides (i.e. where differences in conduct and choices first appear).

As for the level at which the corresponding collective (emergent) property manifests, as we have seen, attributes such as team-level productivity, cross-functional informational coherence, or relationship-level trust take form within specific social units–for example, within a team, across a cross-functional group, or at the interface between firms–because they reflect how individual contributions are combined and made mutually intelligible within that unit (Mathieu and Chen, 2011; Kuljanin *et al*., 2024). Once viewed at this higher level of analysis, the property reveals features that cannot be inferred from individual behavior alone

**Table 2.** Summary of the three illustrative domains

| Domain | Multilevel view (emergent bottom-up) | Potential future research questions | Methodological approaches | Sampling strategies |
|---|---|---|---|---|
| Inventory management | The informational base needed for inventory decisions is actively constructed across interdependent roles via cycles of disclosure, concealment, and interpretation that can either foster shared understanding or generate fragmented and inconsistent outcomes, potentially affecting the cognitive effort required to interpret and integrate available inputs | • How do disclosure and concealment of function-specific inputs shape the shared informational base for inventory decisions?<br>• How do cycles of transparency and fragmentation in cross-functional exchanges unfold over successive planning rounds and build the shared informational base for inventory decisions?<br>• How do incentive structures, status hierarchies, and role constraints influence whether cross-functional inputs are disclosed, withheld, or reinterpreted in shaping the shared informational base for inventory decisions? | • Controlled Laboratory Experiments + ABM: Laboratory tasks allow manipulation of disclosure incentives and status cues. ABM extends these dynamics to simulate long-run cycles of concealment and reinterpretation that reshape the shared informational base for inventory decisions<br>• Longitudinal Field Studies + Process Tracing: Observing successive planning rounds tracks how the shared informational base for inventory decisions consolidates or fragments. Process tracing pinpoints when episodes of silence or reinterpretation alter the informational base<br>• Embedded Ethnography + Relational Event Modeling (REM): Ethnography reveals informal norms of disclosure, deference, or suppression in cross-functional planning. REM traces the event sequences (who discloses/withholds what, to whom, and when) over successive rounds and links them to changes in the coherence and mutual intelligibility of the shared informational base for inventory decisions<br>• Cross-level Quantitative Analysis (HLM, MSEM) + ABM: Quantitative data on incentive perceptions and status hierarchies link these enablers/constraints to the coherence and mutual intelligibility of the shared informational base for inventory decisions. ABM formalizes micro-rules of disclosure and concealment and simulates their evolution over time to explain the observed relationships | • Cross-functional planning groups as the key loci where disclosure and concealment occur<br>• Sequential sampling across successive planning rounds to trace how disclosure, silence, and reinterpretation evolve<br>• Focal sampling during high-stakes episodes (e.g. major demand shocks, product launch planning, crisis-driven re-planning) where informational asymmetries have the greatest impact<br>• Comparative sampling across planning sessions embedded in different organizational settings, to see how disclosure dynamics accumulate or fragment under varying structures |

(*continued*)

**Table 2.** Continued

| Domain | Multilevel view (emergent bottom-up) | Potential future research questions | Methodological approaches | Sampling strategies |
|---|---|---|---|---|
| Supply chain management | Trust at the buyer-supplier level emerges from repeated interactions at boundary roles, where credibility builds unevenly around critical actors and remains fragile, as single breakdowns can undermine the entire relationship | • How do localized interactions at boundary roles drive the formation of buyer–supplier trust?<br>• How do signals of reliability and failure accumulated over successive interactions at boundary interfaces build or erode buyer–supplier trust?<br>• How do power asymmetries, integration mechanisms, and incentive systems influence interaction patterns at boundary interfaces that build or erode buyer–supplier trust? | • ABM + Longitudinal Case Studies: ABM can formalize hypotheses on how repeated micro-interactions at boundary roles generate patterns of credibility. Longitudinal case evidence (e.g. tracking specific buyer–supplier interfaces over time) can validate whether these modeled trajectories of trust accumulation or erosion materialize<br>• Embedded Ethnography + ABM: In-depth observation of boundary actors (buyers, technical liaisons, account managers) can reveal the subtle behaviors that establish or weaken trust. These insights inform ABM models, enriching their realism and ecological validity<br>• Field Experiments + Process Tracing: Controlled interventions in boundary exchanges (e.g. introducing structured communication protocols or transparency mechanisms) can test how specific signals of reliability alter trust dynamics. Process tracing then uncovers how subsequent interactions and episodes accumulate over time into relationship-level trust or distrust<br>• Cross-level Quantitative Analysis + ABM: Quantitative data capture organizational enablers (e.g. power asymmetries, integration mechanisms, incentive systems) and relationship-level outcomes. ABM complements these by illustrating how certain local credibility dynamics consolidate into durable trust, while others remain fragile | • Boundary roles and interfaces (buyers, supplier liaisons, account managers) as the primary interactional units where credibility is enacted<br>• Dense episodic sampling across repeated interactions (e.g. issue escalations, problem-solving meetings) to trace how signals of reliability accumulate or erode over time<br>• Temporal designs with multiple waves of observation, aligned with key relational milestones (e.g. contract renewals, new product launches, crisis episodes), to capture both gradual consolidation and sudden breakdowns of trust<br>• Comparative sampling across multiple buyer-supplier dyads to capture why similar governance conditions foster trust in some relationships but fail in others |

(*continued*)

**Table 2.** Continued

| Domain | Multilevel view (emergent bottom-up) | Potential future research questions | Methodological approaches | Sampling strategies |
|---|---|---|---|---|
| Productivity management | Productivity improvement capabilities at the team-level emerge over time from the enactment of practices in day-to-day activities, shaped by local interactions, informal roles, and cumulative learning dynamics | • How do lean practices give rise to interaction patterns that shape team-level improvement capabilities?<br>• How do individual actions and informal roles over time contribute to the development of team-level improvement capabilities?<br>• How do specific organizational arrangements and operational constraints shape the interaction patterns that sustain team-level improvement capabilities? | • ABM + Field Experiments: ABM formalizes hypotheses on how lean practices produce interaction patterns. Field experiments then test whether these predicted patterns materialize in real teams<br>• ABM + Longitudinal Observational Studies: ABM generates expectations about developmental trajectories of productivity improvement efforts. Longitudinal analyses (e.g. event-history, process tracing) validate whether local actions consolidate as predicted<br>• ABM + Ethnographic/Embedded Fieldwork: Ethnography uncovers informal roles and micro-enactments that shape lean practice implementation. These insights refine ABM models and enrich their ecological validity<br>• Cross-level Quantitative Analysis (HLM, MSEM) + ABM: Quantitative data capture organizational enablers and team-level outcomes. ABM helps explain why certain local enactments accumulate into sustained improvement capabilities | • Shop-floor teams as the primary interactional units where productivity improvement practices are put in practice collectively<br>• Dense time-based sampling of recurring coordination episodes (e.g. stand-ups, kanban reviews, improvement events) to capture how interaction patterns develop and reinforce over cycles<br>• Episodic sampling around milestones (e.g. kaizen events, major process changes), to detect shifts in role configurations and coordination patterns<br>• Broader comparative coverage across multiple teams to examine how similar practices consolidate in some contexts but diverge in others |

**Source(s):** Authors' own elaboration

but arise from the way contributions interact, align, and become collectively organized (Zhang and Gable, 2017). Recognizing this higher-level locus of meaning clarifies what should be explained at the collective level and emphasizes that phenomena such as coordinated problem-solving or relational confidence acquire analytical relevance only once interaction dynamics generate recognizable collective patterns.

Third, understanding a multilevel phenomenon also requires specifying the form of emergence through which the collective attribute takes shape (DeChurch and Mesmer-Magnus, 2010; Chan, 1998). As discussed in Section 3, emergent attributes may arise through compositional mechanisms–where individual states converge and can be meaningfully aggregated–or through compilational mechanisms, in which differentiated and complementary contributions combine into a pattern that is not reducible to uniform individual actions. The more appropriate form depends on the substantive nature of the construct, the structure of interdependence, and the kinds of inputs required for the collective attribute to exist. Two brief illustrations help explain this distinction. On the one hand, if the relevant attribute is shared situational awareness, the collective property emerges only when members' perceptions align, making a compositional view appropriate. On the other hand, if the attribute is coordinated problem-solving, the phenomenon depends on how distinct contributions–technical insight, frontline experience, cross-functional information–integrate into a coherent response, reflecting a compilational form of emergence. Clarifying which form applies is essential: compositional and compilational phenomena rest on different theoretical assumptions, exhibit distinct patterns of variability, and require different approaches to operationalization and analysis (Kozlowski *et al*., 2013). Making this distinction explicit thus ensures alignment between the substantive phenomenon and the way it is represented in research design.

Together, these three elements–identifying the level of the mechanism, the level of the collective outcome, and the mechanism linking them–provide the conceptual scaffolding required to study behavioral emergence in BO. They clarify how micro-level tendencies are situated within broader organizational arrangements and how collective attributes can be meaningfully theorized, thereby laying the groundwork for revisiting outcomes and research questions (Section 5.2), and methodological choices (Section 5.3).

### *5.2 Reconsidering outcomes and research questions*

A second aspect concerns what BO treats as a meaningful outcome and how research questions should be formulated to capture emergent behavioral dynamics. So far, much of the field has relied on indicators such as compliance with norms or decision optimality. These measures are valuable when the focus is on isolated decisions, yet a multilevel perspective invites attention to how behavioral tendencies unfold as local actions accumulate, interact, and gradually form into collective configurations.

The three domains discussed earlier help clarify this broader emphasis. In production contexts, our cases show that a conduct aimed at improving productivity develops unevenly across members, sometimes clustering around a few highly engaged actors, sometimes arising from differentiated contributions that gradually align toward improvement. In inventory planning, we illustrate that the informational base for ordering decisions is shaped through recurring cycles of disclosure, selective withholding, reinterpretation, and the partial integration of functional inputs. In buyer–supplier relationships, the examples point out that trust takes form through situated exchanges at boundary roles, strengthening around consistently reliable interfaces or eroding when frictions persist.

From this viewpoint, the analytical interest of studies adopting emergent approaches in BO extends beyond single/individual decisions and actions to the gradual formation of higher-order properties (Hernaus *et al*., 2024; Grand *et al*., 2016). Rather than treating outcomes as fixed end-states, an emergent perspective underscores how recurring interactions progressively form shared orientations, informational structures, or relational qualities.

In this sense, the core object of inquiry shifts to the formation process itself: the unfolding dynamics through which collective arrangements stabilize, evolve, or occasionally fragment over time (Fahimnia *et al*., 2019; Kuljanin *et al*., 2024).

Reframing BO in this way calls for research questions that foreground how collective patterns of behavior and coordination take shape through interaction over time (Kozlowski *et al*., 2013). For instance, as we have seen, in the context of productivity improvement, this perspective directs attention to how differentiated individual contributions and local initiatives are combined in everyday operations to give rise to a shared orientation toward improvement within operational teams. In inventory management, it invites inquiry into how the informational basis for planning is progressively constructed through cross-functional interaction, as information is disclosed, interpreted, contested, and revised across organizational boundaries. Similarly, in buyer–supplier relationships, this reframing highlights how localized signals of reliability, ambiguity, or responsiveness accumulate across multiple interfaces and stabilize into relationship-level patterns of trust.

A multilevel perspective thus broadens what BO can regard as meaningful outcomes. In doing so, it provides a relevant foundation for understanding how behavioral tendencies combine into higher-level properties, helping explain aspects deeply rooted in BO research, such as the variation in operational performance or coordination effectiveness observed across organizations adopting similar practices, tools, and policies.

### *5.3 Aligning methodological and sampling approaches with emergent dynamics*

A final aspect concerns the methodological and sampling implications of studying behavior as emergent and multilevel.

For what concerns methods, these must connect micro-level interactions with the system-level regularities they produce. Kozlowski and Chao (2012), Kozlowski *et al*. (2013), Kuljanin *et al*. (2024), Molina-Azorín *et al*. (2020), and Hernaus *et al*. (2024) provide an in-depth discussion of available options, emphasizing both their potential contributions and inherent limitations. For instance, surveys and correlational studies offer breadth by mapping associations across actors, teams, and organizations, yet they mainly capture static snapshots rather than unfolding processes. Experiments allow tight control over antecedent conditions and reveal how interventions shape behavior, but tend to prioritize internal validity. Longitudinal and observational approaches (e.g. event-history analysis, process tracing, relational event modeling) are well suited to tracing how interactions consolidate or unravel over time, although their implementation is resource-intensive and often difficult to scale. Ethnographic and embedded fieldwork add ecological depth by uncovering informal roles and hidden contingencies, but their insights remain closely tied to the specific contexts in which they are conducted. In this perspective, rather than treating these approaches as substitutes, the most promising path lies in their integration (Russo *et al*., 2024); for example, experiments guided by ethnographic insight and surveys paired with process tracing. Computational methods, and particularly agent-based modeling (ABM), extend this integrated repertoire by formalizing micro-level mechanisms and showing how local rules can generate higher-level regularities. ABM can simulate hypothesized mechanisms, generating expectations about when and why specific patterns unfold, which can then be tested and refined through surveys, experiments, or longitudinal studies. Conversely, empirical observations of how practices consolidate, diverge, or erode provide the grounding needed to calibrate and adapt ABM so that it more faithfully reflects organizational contingencies. Cross-level quantitative techniques (e.g. hierarchical regression models – HLM, multilevel structural equation modeling – MSEM) further reinforce this integration by linking organizational enablers and constraints to locally situated dynamics.

If methods need to account for the emergent patterns, sampling strategies must likewise be designed to mirror the multilevel nature of the analyzed phenomenon. A multilevel view entails a fundamental shift in sampling logic (Kozlowski and Chao, 2012; Kozlowski *et al*., 2013).

Rather than privileging isolated individuals or assuming independence across observations, sampling needs to focus on the interactional units where behavior is collectively produced and sustained. When the goal is to observe how local interactions accumulate into collective patterns, dense sampling within teams or nested units can reveal the micro-dynamics through which higher-level trajectories take shape. By contrast, when the interest lies in variation across contexts, broader comparative coverage across multiple units becomes necessary to identify how similar practices consolidate in some settings but diverge in others. Equally important, sampling must be attuned to temporality. Emergent behaviors rarely crystallize in a single instance; they evolve through repeated cycles of interaction. Accordingly, longitudinal designs with multiple waves, episodic sampling keyed to milestones, or rolling panels that follow actors as they move across roles are particularly well suited to trace how behaviors accumulate, shift, and stabilize over time.

In sum, adopting a multilevel lens expands the toolkit of approaches available to BO scholars. Importantly, it does not discard the core contributions of the field; rather, it places them within a conceptual framework that more accurately reflects the complexity of operational settings. This perspective enhances the theoretical depth, methodological rigor, and practical relevance of BO research, bringing us closer to understanding not just "*what people do in operations*", but "*how behavior takes form*" within systems of evolving roles, mutual adjustments, and layered interactions.

## 6. Conclusions

Although extant research in BO has substantially deepened our understanding of individual cognition and decision-making, it remains less attentive to the dynamics through which behavioral patterns take shape, consolidate, and evolve across organizational levels. Building on this perspective, this paper illustrates how an emergent multilevel lens can enrich BO's explanatory scope by reconnecting micro-level actions with broader organizational outcomes. It also opens new avenues to investigate how informal roles, adaptive expectations, and cross-level processes shape operational behavior and decision-making. This reframing provides at least three implications.

First, it offers a renewed analytical orientation that extends current approaches, broadening the focus from single decisions and actions to the developmental processes through which behavioral tendencies accumulate, align, or diverge over time. By focusing on how micro-level contributions progressively give form to higher-level arrangements, an emergent viewpoint provides a useful basis for theorizing how behavioral regularities take shape within operational settings.

Second, it introduces emergence as a core mechanism for understanding collective functioning in OM. By revealing how interactional dynamics accumulate and give rise to higher-order outcomes, this view clarifies the processes through which day-to-day activities evolve into organized patterns or start to deviate from one another.

Third, it contributes to bridging the divide between micro-level behavioral evidence and macro-level operational outcomes. Multilevel research emphasizes that connecting processes across levels is essential for theories that aim to be both explanatory and practically relevant (Hitt *et al.*, 2007; Molina-Azorín *et al.*, 2020; Zhang and Gable, 2017). By positioning emergence as the link between individual behavior and higher-level organizational arrangements, this perspective helps integrate the rich micro-level insights accumulated in BO with the broader phenomena that shape operational contexts.

On the practical side, embracing an emergent multilevel perspective provides organizations with a diagnostic lens that helps to understand the interactional conditions that sustain or undermine collective functioning. This makes it possible to identify early signals of drift–such as the concentration of initiative in a single operator, the erosion of informational coherence, or the emergence of fragile boundary interfaces–and to intervene by acting on the processes through which these patterns develop.

Overall, as also amply advocated on the pages of the *International Journal of Physical Distribution and Logistics Management* (e.g. van Hoek and Wong, 2025), we hope this work contributes to a growing conversation that sees multilevel theorizing not merely as a refinement of existing models, but as an opportunity to rethink the foundations of behavioral inquiry in OM. We therefore call on scholars to engage more deeply with the processes through which behavior is shaped, aligned, and sustained across levels, embracing designs, questions, and perspectives that reflect the interdependencies and evolving dynamics of operational contexts.

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**References**

Allon, G. and Kremer, M. (2018), "Behavioral foundations of queueing systems", in *The Handbook of Behavioral Operations*.

Aral, S., Brynjolfsson, E. and Van Alstyne, M. (2012), "Information, technology, and information worker productivity", *Information Systems Research*, Vol. 23 No. 3, Part-2, pp. 849-867.

Avcı, B., Loutfi, Z., Mihm, J., Belavina, E. and Keck, S. (2014), "Comparison as incentive: newsvendor decisions in a social context", *Production and Operations Management*, Vol. 23 No. 2, pp. 303-313, doi: 10.1111/j.1937-5956.2012.01354.x.

Bai, B., Dai, H., Zhang, D.J., Zhang, F. and Hu, H. (2022), "The impacts of algorithmic work assignment on fairness perceptions and productivity", *Manufacturing and Service Operations Management*, Vol. 24 No. 6, pp. 3060-3078, doi: 10.1287/msom.2022.1120.

Ball, G.P., Shah, R. and Donohue, K. (2018), "The decision to recall: a behavioral investigation in the medical device industry", *Journal of Operations Management*, Vol. 62, pp. 1-15, doi: 10.1016/j.jom.2018.07.003.

Bandiera, O., Barankay, I. and Rasul, I. (2005), "Social preferences and the response to incentives: evidence from personnel data", *Quarterly Journal of Economics*, Vol. 120 No. 3, pp. 917-962, doi: 10.1162/003355305774268192.

Bandiera, O., Barankay, I. and Rasul, I. (2013), "Team incentives: evidence from a firm level experiment", *Journal of the European Economic Association*, Vol. 11 No. 5, pp. 1079-1114, doi: 10.1111/jeea.12028.

Batt, R.J. and Terwiesch, C. (2017), "Early task initiation and other load-adaptive mechanisms in the emergency department", *Management Science*, Vol. 63 No. 11, pp. 3531-3551, doi: 10.1287/mnsc.2016.2516.

Becker-Peth, M. and Thonemann, U.W. (2016), "Reference points in revenue sharing contracts—how to design optimal supply chain contracts", *European Journal of Operational Research*, Vol. 249 No. 3, pp. 1033-1049, doi: 10.1016/j.ejor.2015.06.007.

Becker-Peth, M., Katok, E. and Thonemann, U.W. (2013), "Designing buyback contracts for irrational but predictable newsvendors", *Management Science*, Vol. 59 No. 8, pp. 1800-1816, doi: 10.1287/mnsc.1120.1662.

Becker-Peth, M. and Thonemann, U.W. (2019), "Behavioral inventory decisions: the newsvendor and other inventory settings", *The Handbook of Behavioral Operations*, pp. 393-432.

Becker-Peth, M., Thonemann, U.W. and Gully, T. (2018), "A note on the risk aversion of informed newsvendors", *Journal of the Operational Research Society*, Vol. 69 No. 7, pp. 1135-1145, doi: 10.1080/01605682.2017.1390525.

Beer, R., Ahn, H.S. and Leider, S. (2018), "Can trustworthiness in a supply chain be signaled?", *Management Science*, Vol. 64 No. 9, pp. 3974-3994, doi: 10.1287/mnsc.2017.2817.

Bendoly, E. and Prietula, M. (2008), "In 'the zone' the role of evolving skill and transitional workload on motivation and realized performance in operational tasks", *International Journal of Operations and Production Management*, Vol. 28 No. 12, pp. 1130-1152.

Bendoly, E. and Swink, M. (2007), "Moderating effects of information access on project management behavior, performance and perceptions", *Journal of Operations Management*, Vol. 25 No. 3, pp. 604-622, doi: 10.1016/j.jom.2006.02.009.

Bendoly, E., Donohue, K. and Schultz, K.L. (2006), "Behavior in operations management: assessing recent findings and revisiting old assumptions", *Journal of Operations Management*, Vol. 24 No. 6, pp. 737-752, doi: 10.1016/j.jom.2005.10.001.

Bendoly, E., Croson, R., Goncalves, P. and Schultz, K. (2010), "Bodies of knowledge for research in behavioral operations", *Production and Operations Management*, Vol. 19 No. 4, pp. 434-452, doi: 10.1111/j.1937-5956.2009.01108.x.

Benzion, U., Cohen, Y., Peled, R. and Shavit, T. (2008), "Decision-making and the newsvendor problem: an experimental study", *Journal of the Operational Research Society*, Vol. 59 No. 9, pp. 1281-1287, doi: 10.1057/palgrave.jors.2602470.

Blanes i Vidal, J. and Nossol, M. (2011), "Tournaments without prizes: evidence from personnel records", *Management Science*, Vol. 57 No. 10, pp. 1721-1736, doi: 10.1287/mnsc.1110.1383.

Bolton, G.E. and Katok, E. (2008), "Learning by doing in the newsvendor problem", *Manufacturing and Service Operations Management*, Vol. 10 No. 3, pp. 519-538.

Bolton, G.E., Ockenfels, A. and Thonemann, U.W. (2012), "Managers and students as newsvendors", *Management Science*, Vol. 58 No. 12, pp. 2225-2233, doi: 10.1287/mnsc.1120.1550.

Bolton, G., Greiner, B. and Ockenfels, A. (2013), "Engineering trust: reciprocity in the production of reputation information", *Management Science*, Vol. 59 No. 2, pp. 265-285, doi: 10.1287/mnsc.1120.1609.

Bolton, G.E., Bonzelet, S., Stangl, T. and Thonemann, U.W. (2023), "Decision making under service-level contracts: the role of cost saliency", *Production and Operations Management*, Vol. 32 No. 4, pp. 1243-1261, doi: 10.1111/poms.13925.

Bonatto, F., Resende, L.M.M. and Pontes, J. (2020), "Relational governance in supply chain", *Benchmarking: An International JournalBenchmarking*, Vol. 27 No. 6, pp. 1711-1741.

Bostian, A.A., Holt, C.A. and Smith, A.M. (2008), "Newsvendor 'pull-to-center' effect: adaptive learning in a laboratory experiment", *Manufacturing and Service Operations Management*, Vol. 10 No. 4, pp. 590-608, doi: 10.1287/msom.1080.0228.

Cachon, G.P. (2003), "Supply chain coordination with contracts", in *Handbooks in Operations Research and Management Science*.

Cantor, D.E. and Jin, Y. (2019), "Theoretical and empirical evidence of behavioral and production line factors that influence helping behavior", *Journal of Operations Management*, Vol. 65 No. 4, pp. 312-332, doi: 10.1002/joom.1019.

Carraro, M., Furlan, A. and Netland, T. (2025), "Unlocking team performance: how shared mental models drive proactive problem-solving", *Human Relations*, Vol. 78 No. 4, pp. 407-437, doi: 10.1177/00187267241247962.

Carter, C.R., Meschnig, G. and Kaufmann, L. (2015), "Moving to the next level: why our discipline needs more multilevel theorization", *Journal of Supply Chain Management*, Vol. 51 No. 4, pp. 94-102, doi: 10.1111/jscm.12083.

Carter, C.R., Rockwood, R.F., Patel, P.C., Bachrach, D., Bendoly, E., DuHadway, S. and Kaufmann, L. (2024), "Experiments in supply chain management research", *Journal of Business Logistics*, Vol. 45 No. 3, e12382, doi: 10.1111/jbl.12382.

Chan, D. (1998), "Functional relations among constructs in the same content domain at different levels of analysis", *Journal of Applied Psychology*, Vol. 83 No. 2, pp. 234-246, doi: 10.1037/0021-9010.83.2.234.

Chen, K.Y. and Wu, D. (2019), "Buyer–supplier interactions", in *The Handbook of Behavioral Operations*.

Chen, L., Kök, A.G. and Tong, J.D. (2013), "The effect of payment schemes on inventory decisions: the role of mental accounting", *Management Science*, Vol. 59 No. 2, pp. 436-451, doi: 10.1287/mnsc.1120.1638.

Chen, J., Neubaum, D.O., Reilly, R.R. and Lynn, G.S. (2015), "The relationship between team autonomy and new product development performance under different levels of technological turbulence", *Journal of Operations Management*, Vol. 33 No. 1, pp. 83-96, doi: 10.1016/j.jom.2014.10.001.

Colicchia, C., Creazza, A., Noè, C. and Strozzi, F. (2019), "Information sharing in supply chains: a review of risks and opportunities using the systematic literature network analysis", *Supply Chain Management*, Vol. 24 No. 1, pp. 5-21, doi: 10.1108/scm-01-2018-0003.

Costantino, F., Di Gravio, G., Shaban, A. and Tronci, M. (2015), "The impact of information sharing on ordering policies to improve supply chain performances", *Computers and Industrial Engineering*, Vol. 82, pp. 127-142, doi: 10.1016/j.cie.2015.01.024.

Cronin, M.A., Weingart, L.R. and Todorova, G. (2011), "Dynamics in groups: are we there yet?", *The Academy of Management Annals*, Vol. 5 No. 1, pp. 571-612, doi: 10.5465/19416520.2011.590297.

Croson, R. (2002), *Why and how to experiment: methodologies from experimental economics*, University of Illinois Law Review, pp. 921-946.

Croson, R. (2005), "The method of experimental economics", *International Negotiation*, Vol. 10 No. 1, pp. 131-148, doi: 10.1163/1571806054741100.

Croson, R. and Donohue, K. (2002), "Experimental economics and supply-chain management", *Interfaces*, Vol. 32 No. 5, pp. 74-82, doi: 10.1287/inte.32.5.74.37.

Croson, R., Schultz, K., Siemsen, E. and Yeo, M.L. (2013), "Behavioral operations: the state of the field", *Journal of Operations Management*, Vol. 31 Nos 1-2, pp. 1-5, doi: 10.1016/j.jom.2012.12.001.

Cui, H.T., Raju, J.S. and Zhang, Z.J. (2007), "Fairness and channel coordination", *Management Science*, Vol. 53 No. 8, pp. 1303-1314, doi: 10.1287/mnsc.1060.0697.

Cui, H.T., Han, W., Li, J. and Tang, O. (2025), "Research evolution of behavioral operations management". doi: 10.2139/ssrn.5496938.

Cusumano, M.A. (1988), *Manufacturing Innovation: Lessons from the Japanese Auto Industry*, MIT Sloan Management Review, available at: https://sloanreview.mit.edu/article/manufacturing-innovation-lessons-from-the-japanese-auto-industry/

D'Urso, D., Chiacchio, F. and Di Mauro, C. (2018), "Group decision making in newsvendor game: a pilot human experiment", *IFAC-PapersOnLine*, Vol. 51 No. 11, pp. 1523-1527, doi: 10.1016/j.ifacol.2018.08.282.

De Vericourt, F., Jain, K., Bearden, J.N. and Filipowicz, A. (2013), "Sex, risk and the newsvendor", *Journal of Operations Management*, Vol. 31 Nos 1-2, pp. 86-92, doi: 10.1016/j.jom.2012.11.001.

DeChurch, L.A. and Mesmer-Magnus, J.R. (2010), "The cognitive underpinnings of effective teamwork: a meta-analysis", *Journal of Applied Psychology*, Vol. 95 No. 1, pp. 32-53, doi: 10.1037/a0017328.

Donohue, K., Katok, E. and Leider, S. (2019), *The Handbook of Behavioral Operations*, Wiley, Hoboken.

Donohue, K., Özer, Ö. and Zheng, Y. (2020), "Behavioral operations: past, present, and future", *Manufacturing and Service Operations Management*, Vol. 22 No. 1, pp. 191-202, doi: 10.1287/msom.2019.0828.

Drazin, R., Glynn, M.A. and Kazanjian, R.K. (1999), "Multilevel theorizing about creativity in organizations: a sensemaking perspective", *Academy of Management Review*, Vol. 24 No. 2, pp. 286-307, doi: 10.2307/259083.

Eckardt, R., Crocker, A., Ahn, Y., Floyd, S.W., Boyd, B.K., Hodgkinson, G.P., Kozlowski, S.W., Moliterno, T.P. and Starbuck, W.H. (2019), "Reflections on the micro–macro divide", *Strategic Organization*, Vol. 17 No. 3, pp. 385-402, doi: 10.1177/1476127018770048.

Eckerd, S., Hill, J., Boyer, K.K., Donohue, K. and Ward, P.T. (2013), "The relative impact of attribute, severity, and timing of psychological contract breach on behavioral and attitudinal outcomes", *Journal of Operations Management*, Vol. 31 Nos 7-8, pp. 567-578, doi: 10.1016/j.jom.2013.06.003.

Elmaghraby, W. and Katok, E. (2019), "Behavioral research in competitive bidding and auction design", in *The Handbook of Behavioral Operations*.

Engelbrecht-Wiggans, R. and Katok, E. (2007), "Regret in auctions: theory and evidence", *Economic Theory*, Vol. 33 No. 1, pp. 81-101, doi: 10.1007/s00199-006-0180-9.

Engelbrecht-Wiggans, R. and Katok, E. (2008), "Regret and feedback information in first-price sealed-bid auctions", *Management Science*, Vol. 54 No. 4, pp. 808-819, doi: 10.1287/mnsc.1070.0806.

Fahimnia, B., Pournader, M., Siemsen, E., Bendoly, E. and Wang, C. (2019), "Behavioral operations and supply chain management–a review and literature mapping", *Decision Sciences*, Vol. 50 No. 6, pp. 1127-1183, doi: 10.1111/deci.12369.

Farhan, M., Krejci, C.C. and Cantor, D.E. (2023), "Do a non-core worker's procedural justice concerns influence their engagement in helping behavior? A multi-method study", *International Journal of Physical Distribution and Logistics Management*, Vol. 53 No. 9, pp. 1015-1042, doi: 10.1108/ijpdlm-02-2022-0044.

Flyvbjerg, B. (2021), "Top behavioral biases in project management", *Project Management Journal*, Vol. 52 No. 6, pp. 531-546, doi: 10.1177/87569728211049046.

Furlan, A., Galeazzo, A. and Paggiaro, A. (2019), "Organizational and perceived learning in the workplace", *Organization Science*, Vol. 30 No. 2, pp. 280-297.

Galeazzo, A., Furlan, A. and Vinelli, A. (2021), "The role of employees' participation and managers' authority on continuous improvement and performance", *International Journal of Operations and Production Management*, Vol. 41 No. 13, pp. 34-64, doi: 10.1108/ijopm-07-2020-0482.

Galeazzo, A., Furlan, A., Tosetto, D. and Vinelli, A. (2024), "Are lean and digital engaging better problem solvers? An empirical study on Italian manufacturing firms", *International Journal of Operations and Production Management*, Vol. 44 No. 6, pp. 1217-1248, doi: 10.1108/ijopm-06-2023-0477.

Gavirneni, S. and Xia, Y. (2009), "Anchor selection and group dynamics in newsvendor decisions—a note", *Decision Analysis*, Vol. 6 No. 2, pp. 87-97, doi: 10.1287/deca.1090.0136.

Giannoccaro, I. (2013), *Behavioral Issues in Operations Management*, Springer, London.

Gino, F. and Pisano, G. (2008), "Toward a theory of behavioral operations", *Manufacturing and Service Operations Management*, Vol. 10 No. 4, pp. 676-691, doi: 10.1287/msom.1070.0205.

Glock, C.H., Grosse, E.H., Elbert, R.M. and Franzke, T. (2017), "Maverick picking: the impact of modifications in work schedules on manual order picking processes", *International Journal of Production Research*, Vol. 55 No. 21, pp. 6344-6360, doi: 10.1080/00207543.2016.1252862.

Goudarzi, F.S., Bergey, P. and Olaru, D. (2023), "Behavioral operations management and supply chain coordination mechanisms", *Supply Chain Management*, Vol. 28 No. 1, pp. 140-161, doi: 10.1108/scm-03-2021-0111.

Grand, J.A., Braun, M.T., Kuljanin, G., Kozlowski, S.W. and Chao, G.T. (2016), "The dynamics of team cognition", *Journal of Applied Psychology*, Vol. 101 No. 10, pp. 1353-1385, doi: 10.1037/apl0000136.

Grant, A.M. and Ashford, S.J. (2008), "The dynamics of proactivity at work", *Research in Organizational Behavior*, Vol. 28, pp. 3-34, doi: 10.1016/j.riob.2008.04.002.

Greenberg, J. (1988), "Equity and workplace status: a field experiment", *Journal of Applied Psychology*, Vol. 73 No. 4, pp. 606-613, doi: 10.1037/0021-9010.73.4.606.

Gullett, J., Do, L., Canuto-Carranco, M., Brister, M., Turner, S. and Caldwell, C. (2009), "The buyer–supplier relationship: an integrative model of ethics and trust", *Journal of Business Ethics*, Vol. 90 No. 3, pp. 329-341, doi: 10.1007/s10551-010-0430-4.

Hackman, J.R. (2003), "Learning more by crossing levels: evidence from airplanes, hospitals, and orchestras", *Journal of Organizational Behavior*, Vol. 24 No. 8, pp. 905-922, doi: 10.1002/job.226.

Hämäläinen, R.P., Luoma, J. and Saarinen, E. (2013), "On the importance of behavioral operational research: the case of understanding and communicating about dynamic systems", *European Journal of Operational Research*, Vol. 228 No. 3, pp. 623-634, doi: 10.1016/j.ejor.2013.02.001.

Hernaus, T., Potočnik, K., Lira, E.M. and LeBreton, J.M. (2024), "Multilevel empirical research: a call for more mixed-methods approaches", *European Management Journal*, Vol. 42 No. 4, pp. 452-461, doi: 10.1016/j.emj.2024.06.001.

Hill, J.A., Eckerd, S., Wilson, D. and Greer, B. (2009), "The effect of unethical behavior on trust in a buyer–supplier relationship: the mediating role of psychological contract violation", *Journal of Operations Management*, Vol. 27 No. 4, pp. 281-293, doi: 10.1016/j.jom.2008.10.002.

Hitt, M.A., Beamish, P.W., Jackson, S.E. and Mathieu, J.E. (2007), "Building theoretical and empirical bridges across levels", *Academy of Management Journal*, Vol. 50 No. 6, pp. 1385-1399, doi: 10.5465/amj.2007.28166219.

Ho, T.H. and Zhang, J. (2008), "Designing pricing contracts for boundedly rational customers: does the framing of the fixed fee matter?", *Management Science*, Vol. 54 No. 4, pp. 686-700, doi: 10.1287/mnsc.1070.0788.

Ho, T.H., Lim, N. and Cui, T.H. (2010), "Reference dependence in multilocation newsvendor models: a structural analysis", *Management Science*, Vol. 56 No. 11, pp. 1891-1910, doi: 10.1287/mnsc.1100.1225.

Hossain, T. and List, J.A. (2012), "The behavioralist visits the factory: increasing productivity using simple framing manipulations", *Management Science*, Vol. 58 No. 12, pp. 2151-2167, doi: 10.1287/mnsc.1120.1544.

House, R., Rousseau, D.M. and Thomashunt, M. (1995), "The meso paradigm-a framework for the integration of micro and macro organizational-behavior", *Research in Organizational Behavior*, Vol. 17, pp. 71-114.

Hozak, K. and Olsen, E.O. (2015), "Lean psychology and the theories of 'thinking, fast and slow'", *International Journal of Lean Six Sigma*, Vol. 6 No. 3, pp. 206-225, doi: 10.1108/ijlss-10-2014-0030.

Inderfurth, K., Sadrieh, A. and Voigt, G. (2013), "The impact of information sharing on supply chain performance under asymmetric information", *Production and Operations Management*, Vol. 22 No. 2, pp. 410-425, doi: 10.1111/j.1937-5956.2012.01372.x.

Ireland, R.D. and Webb, J.W. (2007), "A multi-theoretic perspective on trust and power in strategic supply chains", *Journal of Operations Management*, Vol. 25 No. 2, pp. 482-497, doi: 10.1016/j.jom.2006.05.004.

Januszek, S., Macuvele, J., Friedli, T. and Netland, T.H. (2023), "The role of management in lean implementation", *International Journal of Operations and Production Management*, Vol. 43 No. 3, pp. 401-427.

Jap, S.D. (2007), "The impact of online reverse auction design on buyer–supplier relationships", *Journal of Marketing*, Vol. 71 No. 1, pp. 146-159, doi: 10.1509/jmkg.71.1.146.

Jeong, I.J. and Leon, V.J. (2012), "A serial supply chain of newsvendor problem with safety stocks under complete and partial information sharing", *International Journal of Production Economics*, Vol. 135 No. 1, pp. 412-419, doi: 10.1016/j.ijpe.2011.08.015.

Johns, G. (2006), "The essential impact of context on organizational behavior", *Academy of Management Review*, Vol. 31 No. 2, pp. 386-408, doi: 10.5465/amr.2006.20208687.

Kalkanci, B., Chen, K.Y. and Erhun, F. (2011), "Contract complexity and performance under asymmetric demand information", *Management Science*, Vol. 57 No. 4, pp. 689-704, doi: 10.1287/mnsc.1110.1318.

Katok, E. (2011), "Laboratory experiments in operations management, transforming research into action", *Informs Tutorials in Operations Research*, pp. 15-35.

Katok, E. and Pavlov, V. (2013), "Fairness in supply chain contracts: a laboratory study", *Journal of Operations Management*, Vol. 31 No. 3, pp. 129-137, doi: 10.1016/j.jom.2013.01.001.

Katok, E. and Siemsen, E. (2011), "Why genius leads to adversity: experimental evidence on the reputational effects of task difficulty choices", *Management Science*, Vol. 57 No. 6, pp. 1042-1054, doi: 10.1287/mnsc.1110.1331.

Katz, D. and Kahn, R.L. (1978), *The Social Psychology of Organizations*, Wiley, New York.

Kc, D.S. (2014), "Does multitasking improve performance? Evidence from the emergency department", *Manufacturing & Service Operations Management*, Vol. 16 No. 2, pp. 168-183.

Kc, D.S. and Terwiesch, C. (2009), "Impact of workload on service time and patient safety: an econometric analysis of hospital operations", *Management Science*, Vol. 55 No. 9, pp. 1486-1498, doi: 10.1287/mnsc.1090.1037.

Klein, K.J., Dansereau, F. and Hall, R.J. (1994), "Levels issues in theory development, data collection, and analysis", *Academy of Management Review*, Vol. 19 No. 2, pp. 195-229, doi: 10.2307/258703.

Kocabıyıkoğlu, A., Önkal, D., Göğüş, C.I. and Gönül, M.S. (2024), "Newsvendor decisions under incomplete information", *Journal of Management Mathematics*, Vol. 35 No. 3, pp. 427-462, doi: 10.1093/imaman/dpae008.

Kozlowski, S.W. (2022), "The data revolution and the interplay between theory and data", in *Data, Methods and Theory in the Organizational Sciences*, Routledge.

Kozlowski, S.W. and Chao, G.T. (2012), "The dynamics of emergence: cognition and cohesion in work teams", *Managerial and Decision Economics*, Vol. 33 Nos 5-6, pp. 335-354, doi: 10.1002/mde.2552.

Kozlowski, S.W. and Klein, K.J. (2000), "A multilevel approach to theory and research in organizations: contextual, temporal, and emergent processes", in *Multilevel Theory, Research, and Methods in Organizations: Foundations, Extensions, and New Directions*, pp. 3-90.

Kozlowski, S.W., Chao, G.T. and Kuljanin, G. (2013), "Advancing multilevel research", *Organizational Research Methods*, Vol. 16 No. 4, pp. 581-615.

Kremer, M., Minner, S. and Van Wassenhove, L.N. (2010), "Do random errors explain newsvendor behavior?", *Manufacturing and Service Operations Management*, Vol. 12 No. 4, pp. 673-681, doi: 10.1287/msom.1100.0294.

Kuljanin, G., Braun, M.T., Grand, J.A., Olenick, J.D., Chao, G.T. and Kozlowski, S.W. (2024), "Advancing organizational science with computational process theories", *The Leadership Quarterly*, Vol. 35 No. 4, 101797, doi: 10.1016/j.leaqua.2024.101797.

Lazear, E.P. (2000), "Performance pay and productivity", *American Economic Review*, Vol. 90 No. 5, pp. 1346-1361, doi: 10.1257/aer.90.5.1346.

Lee, Y.S. and Siemsen, E. (2017), "Task decomposition and newsvendor decision making", *Management Science*, Vol. 63 No. 10, pp. 3226-3245, doi: 10.1287/mnsc.2016.2521.

Lemoine, G.J., Ghahremani, H. and Norris, K. (2026), "The curious case of cross-level effects: refining our understanding to match our methods", *Journal of Organizational Behavior*, Vol. 47 No. 3, pp. 365-382.

Linderman, K., Schroeder, R.G. and Choo, A.S. (2006), "Six sigma: the role of goals in improvement teams", *Journal of Operations Management*, Vol. 24 No. 6, pp. 779-790, doi: 10.1016/j.jom.2005.08.005.

Loch, C.H. and Wu, Y. (2007), "Behavioral operations management. foundations and trends® in technology", *Information and Operations Management*, Vol. 1 No. 3, pp. 121-232, doi: 10.1561/0200000009.

Loch, C.H. and Wu, Y. (2008), "Social preferences and supply chain performance: an experimental study", *Management Science*, Vol. 54 No. 11, pp. 1835-1849, doi: 10.1287/mnsc.1080.0910.

Long, X. and Nasiry, J. (2015), "Prospect theory explains newsvendor behavior: the role of reference points", *Management Science*, Vol. 61 No. 12, pp. 3009-3012, doi: 10.1287/mnsc.2014.2050.

Lurie, N.H. and Swaminathan, J.M. (2009), "Is timely information always better? The effect of feedback frequency on decision making", *Organizational Behavior and Human Decision Processes*, Vol. 108 No. 2, pp. 315-329, doi: 10.1016/j.obhdp.2008.05.005.

Marks, M.A., Mathieu, J.E. and Zaccaro, S.J. (2001), "A temporally based framework and taxonomy of team processes", *Academy of Management Review*, Vol. 26 No. 3, pp. 356-376, doi: 10.2307/259182.

Mas, A. and Moretti, E. (2009), "Peers at work", *American Economic Review*, Vol. 99 No. 1, pp. 112-145, doi: 10.1257/aer.99.1.112.

Mathieu, J.E. and Chen, G. (2011), "The etiology of the multilevel paradigm in management research", *Journal of Management*, Vol. 37 No. 2, pp. 610-641, doi: 10.1177/0149206310364663.

Molina-Azorín, J.F., Pereira-Moliner, J., López-Gamero, M.D., Pertusa-Ortega, E.M. and José Tarí, J. (2020), "Multilevel research: foundations and opportunities in management", *Business Research Quarterly*, Vol. 23 No. 4, pp. 319-333, doi: 10.1177/2340944420966970.

Moliterno, T.P. and Mahony, D.M. (2011), "Network theory of organization: a multilevel approach", *Journal of management*, Vol. 37 No. 2, pp. 443-467, doi: 10.1177/0149206310371692.

Morgan, J., Steiglitz, K. and Reis, G. (2003), "The spite motive and equilibrium behavior in auctions", *Contributions to Economic Analysis and Policy*, Vol. 2 No. 1, pp. 1102-1125, doi: 10.2202/1538-0645.1102.

Morgeson, F.P. and Hofmann, D.A. (1999), "The structure and function of collective constructs", *Academy of Management Review*, Vol. 24 No. 2, pp. 249-265, doi: 10.2307/259081.

Moritz, B.B., Hill, A.V. and Donohue, K.L. (2013), "Individual differences in the newsvendor problem: behavior and cognitive reflection", *Journal of Operations Management*, Vol. 31 Nos 1-2, pp. 72-85, doi: 10.1016/j.jom.2012.11.006.

Morrison, B. (2015), "The problem with workarounds is that they work", *Journal of Operations Management*, Vol. 39, pp. 79-91.

Mukherjee, U.K. and Sinha, K.K. (2018), "Product recall decisions in medical device supply chains: a big data analytic approach to evaluating judgment bias", *Production and Operations Management*, Vol. 27 No. 10, pp. 1816-1833, doi: 10.1111/poms.12696.

Netland, T.H., Schloetzer, J.D. and Ferdows, K. (2015), "Implementing corporate lean programs: the effect of management control practices", *Journal of Operations Management*, Vol. 36 No. 1, pp. 90-102, doi: 10.1016/j.jom.2015.03.005.

Neugebauer, T. and Selten, R. (2006), "Individual behavior of first-price auctions: the importance of information feedback in computerized experimental markets", *Games and Economic Behavior*, Vol. 54 No. 1, pp. 183-204, doi: 10.1016/j.geb.2005.10.001.

Ockenfels, A. and Selten, R. (2014), "Impulse balance in the newsvendor game", *Games and Economic Behavior*, Vol. 86, pp. 237-247, doi: 10.1016/j.geb.2014.03.012.

Ockenfels, A. and Selten, R. (2015), "Impulse balance and multiple-period feedback in the newsvendor game", *Production and Operations Management*, Vol. 24 No. 12, pp. 1901-1906, doi: 10.1111/poms.12399.

Oh, H.K., Abdulla, H. and Oliva, R. (2024), "Behavioral multi-lever decision-making: a study of consumer return policy, price, and inventory decisions", *Journal of Operations Management*, Vol. 70 No. 1, pp. 137-156, doi: 10.1002/joom.1276.

Oliva, R. (2001), "Tradeoffs in responses to work pressure in the service industry", *California Management Review*, Vol. 43 No. 4, pp. 26-43, doi: 10.2307/41166099.

Oliva, R. and Sterman, J.D. (2001), "Cutting corners and working overtime: quality erosion in the service industry", *Management Science*, Vol. 47 No. 7, pp. 894-914, doi: 10.1287/mnsc.47.7.894.9807.

Oliva, R. and Watson, N. (2011), "Cross-functional alignment in supply chain planning: a case study of sales and operations planning", *Journal of Operations Management*, Vol. 29 No. 5, pp. 434-448, doi: 10.1016/j.jom.2010.11.012.

Özer, Ö. and Zheng, Y. (2019), "Trust and trustworthiness", in *The Handbook of Behavioral Operations*.

Özer, Ö., Zheng, Y. and Chen, K.Y. (2011), "Trust in forecast information sharing", *Management Science*, Vol. 57 No. 6, pp. 1111-1137, doi: 10.1287/mnsc.1110.1334.

Özer, Ö., Zheng, Y. and Ren, Y. (2014), "Trust, trustworthiness, and information sharing in supply chains bridging China and the United States", *Management Science*, Vol. 60 No. 10, pp. 2435-2460, doi: 10.1287/mnsc.2014.1905.

Özer, Ö., Subramanian, U. and Wang, Y. (2018), "Information sharing, advice provision, or delegation: what leads to higher trust and trustworthiness?", *Management Science*, Vol. 64 No. 1, pp. 474-493, doi: 10.1287/mnsc.2016.2617.

Perera, H.N., Fahimnia, B. and Tokar, T. (2020), "Inventory and ordering decisions: a systematic review on research driven through behavioral experiments", *International Journal of Operations and Production Management*, Vol. 40 Nos 7/8, pp. 997-1039, doi: 10.1108/ijopm-05-2019-0339.

Pulles, N.J., Veldman, J., Schiele, H. and Sierksma, H. (2014), "Pressure or pamper? The effects of power and trust dimensions on supplier resource allocation", *Journal of Supply Chain Management*, Vol. 50 No. 3, pp. 16-36, doi: 10.1111/jscm.12049.

Quiroga, B.F., Moritz, B.B. and Guide, V.D.R. Jr (2021), "The role of transparency in procurement: revealed versus concealed scoring rules in sealed bid A + B auctions", *Journal of Operations Management*, Vol. 67 No. 1, pp. 71-81, doi: 10.1002/joom.1104.

Ren, Y. and Croson, R. (2013), "Overconfidence in newsvendor orders", *Management Science*, Vol. 59 No. 11, pp. 2502-2517, doi: 10.1287/mnsc.2013.1715.

Repenning, N.P. and Sterman, J.D. (2002), "Capability traps and self-confirming attribution errors in the dynamics of process improvement", *Administrative Science Quarterly*, Vol. 47 No. 2, pp. 265-295, doi: 10.2307/3094806.

Russo, I., Confente, I., Holmström, J., Öhman, M. and Tokar, T. (2024), "Embracing methodological evolution and diversity in logistics and supply chain management research", *International Journal of Physical Distribution and Logistics Management*, Vol. 54 Nos 7/8, pp. 653-672, doi: 10.1108/ijpdlm-05-2024-0205.

Saabye, H., Powell, D.J. and Coughlan, P. (2023), "Lean and action learning: towards an integrated theory?", *International Journal of Operations and Production Management*, Vol. 43 No. 13, pp. 128-151, doi: 10.1108/ijopm-06-2022-0371.

Sahin, F. and Robinson, E.P. (2002), "Flow coordination and information sharing in supply chains: review, implications, and directions for future research", *Decision Sciences*, Vol. 33 No. 4, pp. 505-536, doi: 10.1111/j.1540-5915.2002.tb01654.x.

Schoenherr, T., Bendoly, E., Bachrach, D.G. and Hood, A.C. (2017), "Task interdependence impacts on reciprocity in IT implementation teams", *Production and Operations Management*, Vol. 26 No. 4, pp. 667-685, doi: 10.1111/poms.12671.

Schorsch, T., Wallenburg, C.M. and Wieland, A. (2017), "The human factor in SCM: introducing a meta-theory of behavioral supply chain management", *International Journal of Physical Distribution and Logistics Management*, Vol. 47 No. 4, pp. 238-262.

Schultz, K.L., Juran, D.C., Boudreau, J.W., McClain, J.O. and Thomas, L.J. (1998), "Modeling and worker motivation in JIT production systems", *Management Science*, Vol. 44 No. 12-part-1, pp. 1595-1607, doi: 10.1287/mnsc.44.12.1595.

Schultz, K.L., Juran, D.C. and Boudreau, J.W. (1999), "The effects of low inventory on the development of productivity norms", *Management Science*, Vol. 45 No. 12, pp. 1664-1678, doi: 10.1287/mnsc.45.12.1664.

Schultz, K.L., Schoenherr, T. and Nembhard, D. (2010), "An example and a proposal concerning the correlation of worker processing times in parallel tasks", *Management Science*, Vol. 56 No. 1, pp. 176-191, doi: 10.1287/mnsc.1090.1080.

Schultz, K.L., Robinson, L.W., Thomas, L.J., Schultz, J. and McClain, J.O. (2018), "The use of framing in inventory decisions", *Production and Operations Management*, Vol. 27 No. 1, pp. 49-57, doi: 10.1111/poms.12782.

Schweitzer, M.E. and Cachon, G.P. (2000), "Decision bias in the newsvendor problem with a known demand distribution", *Management Science*, Vol. 46 No. 3, pp. 404-420, doi: 10.1287/mnsc.46.3.404.12070.

Shamsollahi, A., Chmielewski-Raimondo, D.A., Bell, S.J. and Kachouie, R. (2021), "Buyer–supplier relationship dynamics: a systematic review", *Journal of the Academy of Marketing Science*, Vol. 49 No. 2, pp. 418-436, doi: 10.1007/s11747-020-00743-1.

Shearer, B. (2004), "Piece rates, fixed wages and incentives", *The Review of Economic Studies*, Vol. 71 No. 2, pp. 513-534, doi: 10.1111/0034-6527.00294.

Stasser, G. (1992), "Information salience and the discovery of hidden profiles by decision-making groups: a 'thought experiment'", *Organizational Behavior and Human Decision Processes*, Vol. 52 No. 1, pp. 156-181, doi: 10.1016/0749-5978(92)90049-d.

Stentoft, J., Freytag, P.V. and Mikkelsen, O.S. (2021), "The S&OP process and the influence of personality and key behavioral indicators", *International Journal of Physical Distribution and Logistics Management*, Vol. 51 No. 6, pp. 585-606.

Su, X. (2008), "Bounded rationality in newsvendor models", *Manufacturing and Service Operations Management*, Vol. 10 No. 4, pp. 566-589, doi: 10.1287/msom.1070.0200.

Svanberg, M. (2020), "Guidelines for establishing practical relevance in logistics and supply chain management research", *International Journal of Physical Distribution and Logistics Management*, Vol. 50 No. 2, pp. 215-232, doi: 10.1108/ijpdlm-11-2018-0373.

Tokar, T. (2010), "Behavioural research in logistics and supply chain management", *The International Journal of Logistics Management*, Vol. 21 No. 1, pp. 89-103, doi: 10.1108/09574091011042197.

Tokar, T., Aloysius, J., Waller, M. and Hawkins, D.L. (2016), "Exploring framing effects in inventory control decisions", *Production and Operations Management*, Vol. 25 No. 2, pp. 306-329, doi: 10.1111/poms.12430.

Trott, P., Ellwood, P. and Baxter, D. (2024), "How cognitive bias prevents serendipity in new product development (and what to do about it)", *IEEE Transactions on Engineering Management*, Vol. 71, pp. 11269-11281.

Tuomikangas, N. and Kaipia, R. (2014), "A coordination framework for sales and operations planning (S&OP): synthesis from the literature", *International Journal of Production Economics*, Vol. 154, pp. 243-262.

Turkulainen, V. and Ketokivi, M. (2012), "Cross-functional integration and performance: what are the real benefits?", *International Journal of Operations and Production Management*, Vol. 32 No. 4, pp. 447-467, doi: 10.1108/01443571211223095.

Uppari, B.S. and Hasija, S. (2019), "Modeling newsvendor behavior: a prospect theory approach", *Manufacturing and Service Operations Management*, Vol. 21 No. 3, pp. 481-500, doi: 10.1287/msom.2017.0701.

van Hoek, R. and Wong, C.Y. (2025), "Transformative and disruptive or incremental time wrinkles? How to advance thinking and practice in supply chain sustainability, risk management and digitalization", *International Journal of Physical Distribution and Logistics Management*, Vol. 55 No. 4, pp. 311-340, doi: 10.1108/ijpdlm-12-2024-0473.

vanBurg, E. and vanOorschot, K.E. (2013), "Cooperating to commercialize technology", *Production and Operations Management*, Vol. 22 No. 6, pp. 1336-1355, doi: 10.1111/j.1937-5956.2012.01331.x.

Von Bertalanffy, L. (1968), *General System Theory. George Braziller*, New York.

Wowak, K.D., Craighead, C.W., Ketchen, D.J. and Connelly, B.L. (2022), "Food for thought: recalls and outcomes", *Journal of Business Logistics*, Vol. 43 No. 1, pp. 9-35, doi: 10.1111/jbl.12275.

Yamini, S. (2021), "Behavioral perspective of newsvendor ordering decisions: review, analysis and insights", *Management Decision*, Vol. 59 No. 2, pp. 240-257, doi: 10.1108/md-07-2019-0975.

Yamini, S. (2023), "Impact of loss aversion on the newsvendor problem: a literature review and insights for future researchers", *Opsearch*, Vol. 60 No. 4, pp. 1926-1950, doi: 10.1007/s12597-023-00677-6.

Yu, H., Chen, H. and Long, R. (2017), "Mental fatigue, cognitive bias and safety paradox in Chinese coal mines", *Resources Policy*, Vol. 52, pp. 165-172, doi: 10.1016/j.resourpol.2017.02.005.

Zhang, M. and Gable, G.G. (2017), "A systematic framework for multilevel theorizing in information systems research", *Information Systems Research*, Vol. 28 No. 2, pp. 203-224, doi: 10.1287/isre.2017.0690.

Zhang, Y. and Siemsen, E. (2019), "A meta-analysis of newsvendor experiments", *Production and Operations Management*, Vol. 28 No. 1, pp. 140-156, doi: 10.1111/poms.12899.

Zhang, Y., Donohue, K. and Cui, T.H. (2016), "Contract preferences and performance for the loss-averse supplier: buyback vs revenue sharing", *Management Science*, Vol. 62 No. 6, pp. 1734-1754, doi: 10.1287/mnsc.2015.2182.

Zheng, Y., Gou, Q., Li, J. and Wei, F. (2025), "Decision behaviour and performance in a paired newsvendor: the role of peer effects", *Journal of the Operational Research Society*, Vol. 76 No. 2, pp. 375-392, doi: 10.1080/01605682.2024.2354896.

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