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Rethinking organizational performance management: A complexity theory perspective

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ABSTRACT

Purpose: Traditional approaches to organizational performance management that emphasize objectivity, control, and predictability are rapidly losing relevance in an environment characterized by increasing levels of complexity and dynamism. This paper draws on complexity theory to suggest a new paradigm for managing performance in organizations.

Design/methodology/approach: The paper draws on the common features of complex systems and the corresponding concept of emergence to revisit key themes in organizational performance management and propose a set of implications for research and practice.

Findings: Understanding organizations as complex systems and performance as an emergent property of such systems leads to a set of new research questions, the adoption of alternative methods, and the formulation of novel propositions. It also has various implications for both academic research and managerial practice, from moving away from the traditional notion of organizational alignment to adopting a more explicit stakeholder-based view in the design and use of measurement systems.

Originality/value: The paper highlights the great potential of complexity theory for addressing contemporary issues in the field of organizational performance management and charting the landscape for its future development.

Keywords: Performance measurement, performance management, complexity theory, complex systems, emergence.

1. Introduction

Modern organizations are embedded in social systems characterized by increasing levels of complexity and dynamism. Even before the COVID-19 pandemic, organizations were finding themselves having to deal with disruptive technologies, blurring organizational and market boundaries, and rapidly changing customer needs (Iansiti and Lakhani, 2020; Kopalle *et al.*, 2020; Porter and Heppelmann, 2014). These contexts have stretched traditional management theories and corresponding frameworks and prescriptions to their limits. This is particularly true of organizational performance management, intended as the process of implementing strategy and improving process and organizational performance through the use of performance measurement systems that enable the collection, analysis and communication of relevant data (Melnyk *et al.*, 2014; Mura *et al.*, 2021).

Traditional performance management approaches rest on assumptions of objectivity, control, and predictability (Bourne *et al.*, 2018; Cardinal *et al.*, 2017). *Objectivity* refers to the deployment of tools, such as key performance indicators, that supposedly enable the quantification and assessment of various organizational phenomena without the interference of any subjective element (Micheli and Mari, 2014). Described as "central to theories of organization and strategy" (Chen *et al.*, 2009, p. 1133), *control* is understood as an organization's capacity to monitor and manage its resources and processes, and has become part of the standard repertoire of concepts taught in business schools around the world. *Predictability*, seen as an organization's ability to identify and anticipate future events, is another key tenet of the current performance management paradigm and it is often portrayed as a consequence of objectivity and control. For example, in their well-known piece on "big data", McAfee and Brynjolfsson (2012; p. 62) stated, "we can measure and therefore manage more precisely than ever before. We can make better predictions and smarter decisions. We can target more-effective interventions, and can do so in areas that so far have been

dominated by gut and intuition rather than by data and rigor." A corollary of these assumptions is a view of performance measurement systems and their outputs (i.e., performance information) as having the ability to be aggregated and disaggregated with relative ease. For example, it is possible, and indeed desirable, to "cascade" corporate objectives, indicators, and performance data to the organization's subsidiaries and to trace them to specific functional activities (Hanson *et al.*, 2011) and individual actions that give rise to top-level results.

Despite their appeal, researchers and practitioners have started to question the appropriateness of current frameworks and practices in a world increasingly characterised by complexity, volatility, and uncertainty. For example, Melnyk *et al.* (2014) show that the ability of performance measurement systems to maintain alignment between strategy and operations breaks down in highly turbulent environments. Similarly, authors in innovation management highlight the impossibility of controlling the emergence and development of business ecosystems and warn against the "danger [of] using classical plan-and-execute tactics when what we need is adaptation and indirect shaping" (Fuller *et al.*, 2019; p. 6). The growing literature on the unintended consequences of performance management (see, e.g., Gray *et al.*, 2014; Franco-Santos and Otley, 2018) demonstrates that traditional approaches to setting targets and incentives that fail to take into account the complexity of organizational processes can create a range of negative effects. These can include gaming behaviours, organizational rigidity as well as negative effects on people's well-being, creativity, and motivation.

The discipline and practice of organizational performance management are thus in critical need of an alternative paradigm, which does not require relying on the current tenets of objectivity, control and predictability, and which therefore treats complexity, volatility and uncertainty not as unwelcome temporary conditions, but rather as constituent characteristics

of modern organizations and their environments. To begin to outline this paradigm, we draw on the main principles of complexity theory. From a theoretical point of view, our aim is to propose new research questions, which offer an opportunity to reframe the current theoretical challenges and identify useful avenues for the development of the field. Practically, this alternative paradigm will help provide useful tools and effective practices that are better suited to the task of addressing the needs of organizations and the wider challenges they face today.

The rest of the article is structured as follows. The next section provides a brief exposition of complexity theory and its central concepts of complex systems, emergence, and patterning. We then present an argument for adopting complexity theory as a useful lens for studying organizational performance management. The main section of the paper puts forward a set of implications for advancing research and practice in performance management, specifically in relation to understanding organizations as complex systems and to conceptualizing organizational performance as an emergent property of such systems

2. Complexity science and complexity theory

Complexity science refers to "the scientific study of systems with many interacting parts that exhibit a global behaviour not reducible to the interactions between the individual constituent parts" (Thietart and Forgues, 2011, p. 53). Complexity theory is a broader term, which draws on multiple disciplines to identify the fundamental principles governing the emergence and functioning of complex patterns in the natural and social world.

At its core, complexity theory rests on a number of key assumptions: the presence of a number of independent entities or actors; their diversity; a set of connections between them; a dynamic interaction between them, which can lead to changes in connections and the entities themselves; and the notion of openness, i.e., the possibility of entities joining or leaving these

interactions (Thietart and Forgues, 2011; Maguire, 2011; Boulton *et al.*, 2015, Bourne *et al.*, 2018). Most of the work applying complexity theory examines the nature and functioning of complex systems, understood as sets of interacting elements that operate as a whole, that are relatively distinct from their environment, and that produce system-level effects, which cannot be causally attributed to the individual constituent elements.

It is important to note that the term *complex* in the description of such systems carries a particular meaning that is different from the colloquial use of the word. Thus, a system that can be taken apart and put back together and where the relationships between the constituent components are fixed and well-defined – for example, an airplane – would be considered complicated rather than complex, despite its technical sophistication (Pathak *et al.*, 2007). In contrast, the constituent parts of a complex system – for example, a forest, an organization, or a supply chain - are autonomous, diverse, and independent, and their interaction leads to effects that are not just systemic, but also dynamic and novel (Boulton *et al.*, 2015; Pathak *et al.*, 2007).

Although there is not a single accepted definition of complex systems, Maguire (2011), building on Cilliers (1998), suggests that there is considerable consensus about their key features (see Table I). To illustrate these features, it is useful to consider a common example of a complex system, such as a city (Rybsky and Gonzalez, 2022). Cities consist of large numbers of diverse elements, such as people, infrastructure, and technology, which continuously interact with and influence each other. Nearly all of these interactions are short-range and are ignorant of the behaviour of the entire system, as people, for example, interact with a small number of other people and rarely consider what takes place on the level of the city as a whole. At the same time, these interactions give rise to positive and negative feedback loops. For example, pockets of population with particular income and lifestyle attract similar newcomers, and factors such as crime and diseases interfere with the natural

growth of the population. The dynamics of these interactions are also non-linear in the sense that the effects of individual actions may be diminished or, on the contrary, amplified. Thus, doubling a city's size normally increases its economic output not by 100 percent, but by 120 percent (Rybsky and Gonzalez, 2022). Finally, cities are in a constant state of evolution, which is nevertheless often constrained by their past. For example, the structure and distribution of neighbourhoods may reflect the network of roads built decades or even centuries ago and which strongly influence the future development of the city.

Table I. Common features of complex systems (adapted from Maguire, 2011)

Complex systems consist of a large number of diverse elements
These elements interact dynamically
Interactions are rich: elements can influence each other
Interactions are nonlinear
Interactions are typically short-range
Interactions have positive and negative feedback loops
Complex systems are open to their environment
Complex systems operate under conditions far from equilibrium
Complex systems have histories
Individual elements are typically ignorant of the behaviour of the system as a whole

These features of complex systems give rise to two important phenomena: emergence and patterning. Emergence is a broad term that encompasses a range of processes related to "the creation of order, the formation of new properties and structures in complex systems" (Lichtenstein, 2014, p. 1). Here we define emergence as the rise of novel phenomena on "a

new level of analysis that is analytically distinct from the mass of agents who make it up" (Lichtenstein, 2014, p. 52). As such, emergence differs from aggregation in that the properties of emergent phenomena cannot be traced back to the original basic elements. Cities, for example, develop unique cultures. Similarly, organizational culture is a product of the interaction between people within an organization; yet it is a separate phenomenon that is analytically irreducible to the elements – i.e., the individuals – that have generated it. Culture can thus be regarded as an emergent phenomenon. Moreover, emergent phenomena are qualitatively novel, i.e., they possess properties that are different from those of their constituent elements. Finally, emergent phenomena have causal powers of their own. In other words, once formed, these phenomena begin to influence the elements that had created them through a process of downward causation (Blitz, 1992; Maguire et al, 2011). In that sense, emergence generates new possibilities for the system's evolution. Continuing the example above, despite being a product of individuals and their interactions, an organization's culture also affects the choices and actions of those same individuals within the organization.

The process of patterning reflects the intertwined nature of stability and change in complex systems. It refers to the notion that the interaction of the system's elements can produce relationships that are characterized by apparent stability. When this happens, "the macro characteristics of complex systems tend towards behaviour that looks machine-like and predictable, i.e., the patterns can be readily identified, modelled, and understood" (Boulton *et al.*, 2015; p.32). However, these patterns are only temporarily stable, as they are in fact produced and reinforced by a multitude of autonomous elements constantly interacting with each other. As these elements and their interactions evolve, the observed patterns may change. Sometimes this happens incrementally, as in the case of organizational evolution; sometimes it takes place through dramatic periods of discontinuous change (Holling, 2004). For example, it is possible to describe the main characteristics of an organization's culture at

a point in time, and these may be fairly stable over a period; however, they may also radically change, for example after a major acquisition or during a period of rapid downsizing or growth.

3. Complexity theory in organizational performance management

Several operations management scholars have invoked the notion of complexity and proposed ways of understanding and theorizing it within and across organizations. This research has been carried out in multiple areas, including supply chain management (Choi *et al.*, 2001; Surana *et al.*, 2005; Turner *et al.*, 2018; Bai and Sakis, 2019; Zhao *et al.*, 2019), logistics (Nilsson and Darley, 2006), lean thinking (Saurin *et al.*, 2013; Ferreira *et al.*, 2019), project management (Maylor and Turner, 2017), decision support systems (Baldwin *et al.*, 2010), and risk management (Jamshidi *et al.*, 2016). Although this work has introduced complexity theory into the study of operations, its contributions remain fragmented and limited.

Early research in organizational performance management focused on the insights from organizational cybernetics, particularly the application of Stafford Beer's (1981) Viable System Model (VSM) (Bititci *et al.,* 1997; Hoverstadt *et al.*, 2007; Gregory, 2007; O'Grady *et al.*, 2010). Beer saw cybernetics as the "science of effective organization" (Jackson, 2019, p. 300) and treated its principles as laws. The VSM draws on these principles and "specifies the criteria that any enterprise must meet if it is to be *viable*, i.e., capable of surviving and maintaining its identity in an often unpredictable and turbulent environment" (Jackson, 2019, p. 300). The model consists of five operational and control subsystems, which together ensure that the organization as a whole is capable of adapting to its complex environment while maintaining its purpose and identity.

Performance measurement and management scholars have been drawn to the emphasis that the VSM places on the holistic view of organizations and the role of cybernetic control in managing organizational performance in the face of complexity. For example, Bititci *et al.* (1997) and O'Grady *et al.* (2010) map performance management and management control systems against the VSM to perform an "integrity audit" (Bititci *et al.,* 1997, p. 531), i.e., to ascertain their ability to manage performance systemically. Similarly, Burgess and Wake (2013) use the VSM in a diagnostic mode to surface issues that threaten the organization's viability. Other researchers (e.g., Hoverstadt *et al.,* 2007; Gregory, 2007) examine the VSM's logic of cybernetic control to distil "general systems principles for measurement" (Gregory, 2007, p. 1506) that could be used to manage performance within organizations.

While this work has made important strides in recognizing and examining the implications of complexity for organizational performance management, it has a number of limitations. First, cybernetic-driven modelling, including the VSM, emphasizes survivability and adaptability (cf. Jackson, 2019), thus placing less emphasis on understanding the emergence of novelty and large-scale change in complex systems. Second, the VSM, although explicitly recognizing organizations as open systems, calls for a fairly strict delineation of an organizational context's boundaries, potentially leaving critical drivers of performance outside the system. This is especially important for managing performance in supply chains or ecosystems, where key determinants of organizational performance may be outside an organization's control or indeed be unknown (Micheli and Muctor, 2021). Finally, cybernetics-based approaches to managing complexity tend to focus on meso- and macro-level phenomena – i.e., groups and organizations – and downplay the agency, identity, and interpretive capacity of people in the organizations (Jackson, 2019). In other words, they emphasize the logic of organizing the roles, functions, and control procedures within the

system and tend to discount the effects that people's personalities, preferences, interpretive schema and personal objectives can have on organizational structure and performance.

Alternative perspectives that aim to address this shortcoming, such as the Soft Systems Methodology (Checkland, 1999), have been considered by performance management researchers (e.g., Paucar-Caceres, 2009), but only to a very limited extent. More recent studies have concentrated on three main aspects: a) exploring the implications of adopting a systems of systems perspective (Bourne *et al.*, 2018); b) proposing a contingency view of performance management processes and procedures with respect to the type of complexity faced by the organization (Alexander *et al.*, 2018); and c) examining the complexity of performance measurement and management systems themselves (Okwir *et al.*, 2018).

In relation to the perspectives discussed above, complexity theory's view of systems captured in Table I is broader and more permissive. It acknowledges the value of cybernetics and systems science approaches but recognizes and accommodates a greater variety of factors that contribute to the complexity of organizations and their performance. Being broader, this perspective inevitably comes with fewer ready-made tools (cf. Espinosa and Walker, 2011; Jackson, 2019) and thus calls for innovative contributions from both scholars and practitioners.

In particular, we argue that the main value of complexity theory for the study of performance management can be synthesized into two broad insights whose implications we discuss in the next section: the view of organizations as complex systems and the understanding of organizational performance as an emergent property of these systems. Organizations have long been recognized as complex systems (MacIntosh and MacLean, 1999; Anderson, 1999, Amaral and Uzzi, 2007) and they all exhibit the features of complex systems summarized in Table I. Organizations include multiple people and resources that

constantly interact and influence each other. Most of these interactions are local – in other words, people rarely get an opportunity to come into contact with everyone else in the organization at once. They are also evolving and non-linear in the sense that, as people engage in these interactions, their beliefs and behaviours change and the actions of one group of people can have disproportionately large effects on the rest of the organization. Organizations also continuously require resources in order to survive and, as such, have porous boundaries that enable the flow of resources and information between the organization and its environment. Finally, organizations are path-dependent; that is, many of their resources, such as knowledge, culture, and relationships with suppliers and customers, are built through experience and constrain future choices.

As discussed earlier, complex systems give rise to new phenomena through the process of emergence. In other words, the individual parts of the system do not possess pieces of the system-level phenomena that get aggregated to a macro-level; rather, their local interactions throughout the system produce a qualitatively novel phenomenon that is only observable on the level of the system as a whole and has causal powers of its own. For example, drawing a parallel with resilience of natural systems, Lichtenstein (2014) notes that the "systemic property of resilience is emergent, for it is not "in" any one element or species but arises through the interaction and relationships across all of them" (p. 2). We argue that organizational performance fits these criteria as well.

Organizational performance is not simply the sum of the individual efforts or outputs of various teams. Although individuals and teams make up an organization, they do not inherently possess performance-enhancing or performance-damaging qualities that can be simply aggregated to the organizational level. Rather, it is their interaction with each other over time that generates the organization-level phenomenon of *performance*. Moreover, in organizations, these constituent elements will include "both concrete elements … and more

diffuse characteristics – such as mood or belief – which are less easy to measure and define; … and everything that is there, measurable or not, concrete or not, will contribute to pattern formation and pattern breaking" (Boulton *et al.*, 2015; p. 35). Organizational performance thus arises from a constantly changing set of local interactions, resists disaggregation, and is a system-level phenomenon that is analytically and causally irreducible to its constituent elements: it is an emergent property of an organization.

4. Rethinking organizational performance management

4.1 Implications of organizations being complex systems

Drawing on the common features of complex systems listed in Table I, we identify four main aspects that characterize organizations as complex systems and propose several novel research questions and propositions as well as key implications for theory, methods and practice (see Table II).

The first aspect – organizations consist of many interacting elements - integrates the features of complex systems that highlight the complex internal structure of organizations. This point has several significant implications. For example, new research can benefit from asking explicitly how the internal structure and dynamics of organizations can determine the effectiveness of performance management interventions. This would include assessing important differences in organizational resources and understanding how their interactions may help or hinder performance management efforts. Research must also acknowledge that the process of developing and using performance measurement and management systems is shaped through the interaction of organizational actors with each other *as well as* with their physical and technological environment. Therefore, it will be useful to investigate the role of organizational politics in performance management and to understand how technological

Table II. Implications of complexity theory for research and practice of performance management

Aspect	New Research Questions	Theoretical Perspectives and Methods	Implications for Practice
Organizations consist of many interacting elements (i.e., complex systems consist of a large number of diverse elements; these elements interact dynamically; interactions are rich: elements can influence each other; individual elements are typically ignorant of the behaviour of the system as a whole)	Moving away from a monolithic view of organizations, for example: - How do organizations identify meaningful differences in people and resources? - Which interactions between elements (e.g., different firms in a network or functions in an organisation) are most relevant to meaningful performance management in a specific context? - How does diversity/variation impact internal dynamics within organizations, e.g., making performance management efforts harder or easier? What is the role of organizational politics in the design, implementation and use of performance measurement and management systems? Sociotechnical interactions: how do people interact with their physical and technological environment (e.g., ERP system) in the performance management process? How do interactions between different elements change over time and how does the performance management process have to change as a result? Moving away from the traditional notion of organizational alignment: how can dynamic adjustment between strategy, performance measurement and process improvement can be generated and maintained? How do formal and informal control systems interact within an organization?	Methods that do not rely on averaging the properties of organizational elements, e.g., simulations, system mapping. Methods that explicitly aim to capture the interactions between organizational elements, e.g., social network analysis and actor network theory. Multilevel research designs	Relinquishing the view of organizational performance as the sum of good performance at functional or business unit levels. Expanding the scope of performance measurement systems to go beyond the organization and involving a range of relevant stakeholders. Cascading performance measurement systems across different organizational levels in a system-sensitive way (i.e., paying attention to how different elements and indicators interact at different levels), rather than in a formulaic one (e.g., treating top-level targets as simply the result of aggregating lower level ones). Recognizing that targets and indicators will require contextualizing to reflect

			local settings, especially at the frontline.
The nature of interactions in complex systems (i.e., interactions are nonlinear, typically short-range, and have positive and negative feedback loops)	What is the role of causal mapping in the performance management process? How are causal maps used in organizations? What are the factors affecting the success of performance improvement interventions? How can unintended consequences of performance management be mitigated by focusing on the types of interactions? How is performance information interpreted by different groups of people within the organization? How do local interpretations evolve? What impact does this have on performance? What affects the rate of adoption of (or, conversely, the resistance to) performance measurement systems?	System dynamics Contingency theory studies Process/longitudinal studies Configuration theory Qualitative Comparative Analysis	Focusing on key questions about performance rather than on individual entities. Deploying team-level objectives and indicators. Reviewing performance more frequently.
Openness (i.e., complex systems are open to their environment)	What is the role of different stakeholders in designing, using and reviewing performance management tools? How is performance information interpreted and used by different actors in a system?	Explicit identification and justification of system boundaries.	Developing stakeholder-based performance information systems Considering interaction effects between multiple performance management systems in in interorganizational settings.
Evolution (i.e., complex systems operate under conditions far	How do core notions and practices of performance management change in presence of extreme change and turbulence?	Process/longitudinal studies	Gaining an understanding of the organization's trajectory.

from equilibrium; complex systems have histories)	Does the sequence of performance management interventions matter? How do certain interventions enable or hinder subsequent ones?		Simultaneously managing for the short term and the long term.

systems (e.g., ERP and other IT systems) constrain or enable performance management initiatives. Moreover, as these interactions are dynamic, it will be important to understand how the performance management process itself may need to change over time to remain effective.

Similarly, the view of organizations as a complex web of interacting and evolving elements raises important questions about the notions of alignment and control. Alignment may need to be understood not simply as consistency between objectives and indicators across organizational levels (Khalili Shavarini *et al.*, 2013, Lucianetti *et al.*, 2019), but more as a constant and recursive process of adjustments between multiple elements within the organization (Bellisario *et al.*, 2021).

Proposition 1: In turbulent environments, organizational alignment will require increasingly frequent loops of learning and adaptation of performance management practices.

Likewise, the centrality of local interactions within organizations means that local forms of control may be at least as important as those exercised through centrally designed performance management systems. It is, therefore, necessary to understand how local control is enacted and how formal and informal control systems interact.

Proposition 2: Adapting performance management tools, such as indicators and targets, to the context where they will be used is associated with higher performance.

The critical importance of understanding and capturing the diversity of the elements that make up organizations also requires the use of appropriate methods. For example, the performance of a complex system is often disproportionately affected by small number of

important elements within it. Therefore, using methods that rely on average values, e.g., average inventory across a network of warehouses or average employee productivity, can conceal the source of variation and the drivers of system performance. Methods that explicitly seek to incorporate diversity and variation, for example, system mapping and simulations, can provide an insight into the hidden determinants of performance and help estimate its sensitivity to changes in the organization's structure and environment. Similarly, methods that enable researchers to understand and analyze the relationships between the organization's resources and explore their impact on performance, e.g., social network analysis and actor network theory, are likely to yield novel and important insights into how organizational performance is generated and how it responds to performance management interventions. Finally, the complex nature of interactions within organizations means that micro-level phenomena, such as individual perceptions and actions, affect meso- and macro-level ones, such as departmental policies and organizational strategies, and are affected by them. Understanding the roles and effects of these interdependencies requires designing research studies that explicitly connect multiple level of analysis.

For practitioners, the view of organizations as systems composed of multiple interacting entities has several significant implications, in particular for stakeholder involvement and dynamics as well as for the processes of cascading and aggregating performance measurement tools and information. Broadly speaking, these implications imply that any system-wide performance management initiatives will be affected by the multitude of interests within and outside the organization and will always need to be context-specific.

The second aspect of organizations as complex systems concerns the effects of interactions within organizations, particularly non-linearity and feedback loops. Non-linearity means that it is difficult, if not impossible, to establish deterministic cause-and-effect relationships between actions and their consequences. This has important implications for the

identification of performance drivers and the design and use of tools such as root cause analysis diagrams and causal maps (e.g., strategy maps) (Kaplan and Norton, 2004). If causality is difficult to capture, the role of causal maps in performance management may need to be re-examined and other ways of identifying factors that contribute to success may need to be explored. Moreover, relinquishing the linear view of causality may provide important insights into the well-documented phenomenon of unintended consequences of performance measurement (Gray *et al.*, 2014; Muller, 2017; Franco-Santos and Otley, 2018). For example, understanding how performance information is interpreted by organizational actors and what other considerations bear on their decisions and actions may help to explain the complex mechanisms that generate effects that are perceived as "unintended".

Proposition 3: The variation in individuals' interpretations of performance information is positively associated with the number and scale of unintended behavioural consequences of performance measurement.

Finally, interactions in complex systems produce feedback loops which reinforce old patterns or, conversely, accelerate their collapse. Identifying and understanding these feedback loops is therefore important for determining what parts of the organization are likely to resist performance measurement interventions and which are open to their adoption.

Proposition 4: The effect of performance measurement tools and practices on behaviour will be moderated by a) individuals' mental models; b) patterns of interactions between individuals.

The difficulty of establishing linear causal relationships also calls for the use of perspectives and methods that adopt alternative perspectives on causality. For example, contingency theory, which has a long history of use in the performance management field,

eschews long complicated causal models in favour of identifying a variety of contextual variables that may affect the relationship of interest. The field can also benefit from a wider use of configuration theory (Furnari *et al.*, 2021) and the related method of fuzzy-set qualitative comparative analysis (Bedford and Sandelin, 2005; Fiss, 2011), which looks for sets of elements that are associated with superior performance without specifying the causal link between every element and its effects. Finally, the effects of non-linearity are only observable over time; therefore, understanding how performance measurement efforts interact with and contribute to these effects requires a strong commitment to longitudinal and process research. Methods developed within the system dynamics approach may be especially useful for describing the non-linear effects of performance measurement and identifying the critical feedback loops.

For practitioners, the non-linear nature of interactions within organizations means that the quest for identifying stable, discrete performance drivers may be misguided. Instead, managers may find it more beneficial to focus on the structure and quality of interactions they are responsible for and to lead improvement efforts by addressing wider questions such as "How can we be more efficient?" or "What are we learning from our performance information?" It may also be useful to consider setting shared objectives supported by collective performance indicators, review performance more frequently, and reflect on wider context and wider reasons for success or failure.

The third aspect reflects the open nature of organizations as complex systems. For performance measurement and management, this means that the practices of managing performance need to reflect the major trends in the business environment (Nudurupati et al., 2021). It also suggests that a variety of actors, both within and outside the organization, will have different notions of what constitutes "good performance" and will be interested in different types of performance information. The field would therefore benefit from

developing the stakeholder-based perspective (e.g., Neely *et al.*, 2002; Barney, 2020; Conaty and Robbins, 2021) and understanding its implications for the use of performance management tools and performance information. This will be even more relevant in the context of supply chains, networks, and business ecosystems, where tools such as performance targets, indicators, and strategy maps are important not only for individual organizations to understand and manage their performance, but also for various stakeholder to signal their priorities (Micheli and Muctor, 2021). Explicitly engaging with different perspectives, in a participatory and iterative way, may lead to better results at the inter-organizational level.

Proposition 5: Stakeholder involvement in the creation and deployment of performance measurement systems will moderate the relationship between performance management system use and organizational performance.

Proposition 6: Greater consistency in performance management practices across different organizations will support inter-organizational collaboration.

This aspect also suggests that empirical studies may need to be more explicit in identifying the boundaries of the system under investigation, as this is an important methodological choice that has implications for determining the scope of theorizing, the limitations of the study, and the identification of contextual variables.

For practitioners, the view of organizations as open systems means that organizations will need a system for generating, organizing, and communicating performance information to a range of relevant stakeholders in a meaningful way. Acknowledging the presence of powerful forces outside the organization's boundaries also suggests that it might be more effective to focus on influence rather than control, particularly in networks or ecosystems of firms. Finally, in interorganizational settings, interactions between performance measurement

systems in different organizations must be taken into account. For example, differences in incentive structures in two firms may impact on how employees at both firms collaborate on a joint project.

Finally, complex systems evolve and have histories. Therefore, deciding which performance management approach to use should be seen in light of an organization's past and future, rather than on the basis of what constitutes "best practice". One promising line of research may focus on identifying the boundaries of the traditional assumptions of objectivity, control, and predictability and the corresponding performance management and measurement practices in highly dynamic environments. Likewise, it will be useful to understand how specific performance management interventions (e.g., the introduction of performance measurement systems, specific targets, or incentive schemes) constrain or enable the opportunities for subsequent actions. Methodologically, this means taking the notion of time and the sequence of temporarily stable states into account more explicitly, and reinforces the need for longitudinal and process studies.

Proposition 7: The type and sequence of past performance management interventions will affect the success of future initiatives aimed at measuring, managing, and improving organizational performance.

Proposition 8: Any established relationships between elements of performance management systems and performance will change over time.

For practitioners, the continuous evolution of organizations suggests that managers should try to understand the organization's historical trajectory before initiating performance management interventions. Finally, as both stability and change are temporary states, it is necessary to think about both the short term and the long term simultaneously and to consider which patterns are easier or harder to change at any particular point in time.

4.2 Implications of performance being an emergent property

An equally important set of implications stems from the nature of organizational performance as an emergent phenomenon. As stated earlier, emergent phenomena have three characteristics: they exist on a new level of analysis, are qualitatively novel, and have causal powers of their own.

First, organizational performance is a product of a multitude of entities and events, which are as diverse as organizational resources, structure, decision-making processes, culture, behaviours, leadership styles, and features of the external environment, and which are interconnected in a mutually constitutive and non-linear way. Moreover, organizational performance is not only a product of rational actions taken in pursuit of output optimization. More ambiguous and less easily observable factors such as personalities, emotions, and organizational politics can have an equally strong effect on the level of performance that an organization generates. Finally, performance is affected by the events in the wider environment, which influence people and processes within the organization. Therefore, it may be more fruitful to examine organizational performance as a distinct new phenomenon in its own right, existing on its own level of analysis, and possessing its own properties. Practically, this means that the conversation about performance itself may need to be distinct from the conversation about performance drivers and that organizational performance may need to be seen as having its own dynamics that reflect its nature as a new-level phenomenon – for example, stability, resilience, or rate of growth. The field of performance management will therefore benefit from studies of organizational performance that employ longitudinal

research designs, as changes in organizational performance over time may reveal critical strength and weaknesses of the system – i.e., the organization – that had generated it.

Second, as a qualitatively novel phenomenon, organizational performance has new properties, which need to be understood, captured, and managed. The presence of these novel properties brings into focus the questions of whether and how the entirety of organizational performance can be encapsulated in a set of indicators and, indeed, who decides what aspects of performance are important in a particular context. For scholars, this means that studies in performance management must specify and explain the aspects of performance that they refer to and be mindful of those that might be left out. Moreover, the choice of aspects that constitute the definition of organizational performance in a specific situation may be stakeholder-dependent. This in turn suggests that organizational performance can rarely be treated as an "objective" variable and that a discussion of the process and interests that have influenced its definition must be an explicit part of all performance management research.

Finally, as an emergent phenomenon, organizational performance has causal powers – i.e., it can influence other parts of the system, including those that had generated it. This means that classic studies of performance, where the latter is the dependent variable of choice (Richard *et al.*, 2009), must be complemented by studies that acknowledge the reciprocal causation in complex systems and start with organizational performance as an independent variable. Indeed, it is useful to understand not only how culture, motivation, or strategy influence performance, but also how they are affected by it and what the dynamics of those relationships look like. For example, when does declining performance create negative self-reinforcing effects, negating performance management efforts? What aspects of performance contribute to employee motivation and what is the mechanism of that effect? What is the relationship between perceived organizational performance and the effectiveness of performance management systems? Performance management therefore involves not simply

identifying the "levers", through which the organization's output can be achieved, but understanding the complex processes through which performance is generated and sustained. For example, explaining the effect of the Balanced Scorecard on organizational performance would mean describing *how it contributes* to performance in the presence of multiple other causes. This would in turn involve developing a plausible theory of how the Balanced Scorecard leads to an effect on performance, identifying the necessary conditions for this effect to occur, collecting empirical evidence, and ruling out alternative explanations. Theory-based approaches to performance management, e.g., realist evaluation (Pawson and Tilley, 1997) and contribution analysis (Mayne, 2012; Budhwani and McDavid, 2017) may therefore usefully complement the search for individual performance drivers that has dominated academic and practitioner literature to date.

5. Conclusions

In this paper we argue that progress in the field of organizational performance management has been held back by the traditional assumptions of objectivity, control, and predictability. We also suggest that complexity theory offers a way of addressing this challenge in a theoretically meaningful way, thereby opening new opportunities for advancing the theory and practice of performance management.

We would like to conclude with a number of more general implications of adopting complexity theory for the task of managing organizational performance. First, a complex systems view of organizations favours a general attitude of humility – although managers have to act, they cannot fully predict or control the outcome of their actions. This means that the notions of control, determination and prediction may need to be replaced by those of influence, support, and direction-setting. This is a much softer view of the role of management and, although many of the tools and practices accumulated in the field of

performance measurement and management will remain valid, it will require a shift in mindset.

Second, approaching organizations as complex systems means that deep knowledge of the system and its context are often necessary. The better one knows the system, the easier it is to envisage what interventions are likely to be effective. Therefore, before designing an intervention – for example, a new performance measurement system or set of targets – managers should make every effort to develop this knowledge. Moreover, as every system is unique, this knowledge must be gained locally, and managers must resist the temptation to import success recipes from outside.

Third, if one cannot predict what will lead to an improvement in performance, system-wide change initiatives may have to give way to small-scale experiments that could be scaled up depending on the feedback received from the organization and its environment. These could take the form of pilot projects, rapid prototyping approaches, and trialling new performance management systems and processes in small parts of the organization before rolling them out globally.

Fourth, both scholars and practitioners must remember that, as complex systems are in a constant state of evolution, all definitions and measurement processes are temporary. For example, the meaning of customer loyalty or stakeholder satisfaction may change over time, as these concepts are used in different contexts and for different purposes. This would in turn necessitate changes in the way they are measured and the way these data are used to inform decisions. Performance management systems – from basic definitions to overarching frameworks – must therefore be periodically updated in order to keep pace with organizational evolution.

Finally, it is important not to reify the notion of the system itself. All systemic qualities, including system structure, boundaries, and performance are generated through a

continuous flow of actions taken by people within and outside the system. Effective performance management, therefore, requires gaining an evolving insight into the dynamics of these actions, the experience of people in the face of complexity, and the interplay between individual actions and system processes.

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