Concept Paper

A Duality Model of Dynamic Capabilities: Combining Routines and Improvisation

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Abstract: Dynamic Capabilities are predominantly conceptualised as being based on routine, stable patterns of behaviour. This is paradoxical with their intended purpose to elicit change in firms' resource base and operational capabilities that allows them to face highly dynamic environments. I contribute to resolve this paradox by bringing the concept of duality to the Dynamic Capabilities debate. In particular, I argue that the view of Dynamic Capabilities as routines stems from the misconception that reliable outcomes can be attained only through stable mechanisms. Drawing on the literature on routine dynamics and on improvisation, as well as the empirical evidence of previous research, I propose a duality model that conceives Dynamic Capabilities as based *both* on routines and on improvisation. This duality perspective highlights the interdependence and complementarity between predictable stable routines and extemporaneous improvised actions that are both necessary to reliably achieve the (often radical) change needed to compete in highly dynamic environments. Rather than dealing with stable routines and improvisation as a trade-off, organisations must dynamically strive for the right balance, managing them concurrently and synergistically.

Keywords: dynamic capabilities; duality; routines; improvisation; reliability; paradox

1. Introduction

The Dynamic Capabilities theoretical framework is currently one of the most used frameworks in the field of strategy (Barreto 2010; Schilke et al. 2018; Wenzel et al. 2021). It is used to explain how some organisations develop the ability to reconfigure their resource base and operational capabilities in order to better deal with the swift changes required by ever more dynamic environments.

Despite efforts to consolidate and refine the conceptualisation of Dynamic Capabilities, many tensions and contradictions still remain. One such paradox is the contrast between the notion of Dynamic Capabilities as stable patterns of learned behaviour in the shape of routines, and the (sometimes radical) change they are supposed to enable in order to tackle highly dynamic environments (Salvato and Rerup 2011; Salvato and Vassolo 2018; Schreyögg and Kliesch-Eberl 2007; Wenzel et al. 2021). Although there have been some attempts to address this issue, they have been incomplete, scattered, and unconnected.

In this paper, I take on this issue by integrating previous contributions, relying on the literature on Dynamic Capabilities, but drawing also on research on improvisation, routine dynamics, and high-reliability organisations. I moreover employ concepts and arguments from the literature on strategy in general that have not been applied to Dynamic Capabilities. In particular, I rely on the notion of duality (as opposed to dualism), in which oppositional tendencies are seen as interdependent and mutually enabling rather than opposite or incompatible (Ashforth and Reingen 2014; Farjoun 2010; Smith and Graetz 2006). Building on this, I advance on the previous literature by making a clear and explicit claim that Dynamic Capabilities must combine routine and non-routine elements. To this effect, I start by noting that, in addition to the dominant stance that sees routines as the "building blocks" of Dynamic Capabilities (Becker 2004; Dosi et al. 2000; Howard-Grenville and Rerup 2016;

Salvato and Rerup 2011; Schreyögg and Kliesch-Eberl 2007), there are multiple contributions proposing Dynamic Capabilities are on less repetitive individual and collective behaviours (e.g., Gong et al. 2005; Narduzzo et al. 2000; Rerup and Feldman 2011; Rindova and Kotha 2001). The literature on improvisation (e.g., Baker et al. 2003; Cunha et al. 2016; Moorman and Miner 1998; Mamédio et al. 2022) and on routine dynamics (e.g., D'Adderio 2014; Feldman and Pentland 2003; Rerup and Feldman 2011) offer valuable contributions in this respect.

I go on to argue that the conceptualisation of Dynamic Capabilities as based on stable and patterned routines derives from the notion that reliable outcomes can only be achieved through reliable, predictable means. Borrowing from Farjoun (2010), I discuss the misconception that the desired outcomes of Dynamic Capabilities derive from the consistent action warranted by stable routines, arguing that, instead, the reliability of outcomes often requires flexible, rather than consistent, performance.

I thus propose a duality model of Dynamic Capabilities that considers the combination of stable and dynamic components. Instead of the more common dualism perspective that sees stability and change as contradictory, duality sees them as two "ostensibly contradictory" concepts (Ashforth and Reingen 2014, p. 475) that are nevertheless interdependent and complementary (Farjoun 2010). This implies viewing stability and change as interdependent and mutually enabling elements which are different rather than necessarily opposite or incompatible. I thus aim to contribute to "injecting dynamism into the dynamic capabilities construct" (Peteraf and Tsoukas 2017, p. 178) by proposing a new way of looking at Dynamic Capabilities that is not tied solely to routines, but rather encompasses a more comprehensive view of organisations where both stable routines and improvisation are required to reliably achieve the desired results of creating and reconfiguring resources and capabilities in order to respond to environmental challenges. I conclude by briefly exploring the implications of this model to theory, methodology and practice.

2. Dynamic Capabilities: Conceptualisations and Contradictions

The concept of Dynamic Capabilities was brought to attention by Teece et al. (1997), who defined them "as the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments" (p. 516). They present this framework as an extension of the resource-based view (RBV) of the firm to infuse a more dynamic approach that accounts for the influence of environmental changes on the evolution of firm resources and capabilities (Wang and Ahmed 2007). Many additional contributions to the conceptualisation of Dynamic Capabilities soon followed, not always convergent. Table 1 presents a sample of the definitions cited most often, illustrating this diversity.

Attempts have been made to reach a minimum denominator definition that encapsulates the essence of Dynamic Capabilities. Helfat et al. (2007) proposed that "A dynamic capability is the capacity of an organisation to purposefully create, extend, or modify its resource base." (pp. 1, 4). A number of additional aspects are important to understand the concept and distinguish it from others. For instance, Dynamic Capabilities are often defined by contrast to operational or ordinary capabilities. Both are organisational capabilities, but while operational capabilities are "the activities needed to meet current objectives" (Teece 2016, p. 210), Dynamic Capabilities are those directed at changing operational capabilities. Thus, operational capabilities are those required to efficiently and effectively carry out the organisation's current operations, primarily aimed at maintaining the status quo (Helfat and Winter 2011; Schilke et al. 2018) and achieving efficiency (Teece 2016, 2020). Dynamic Capabilities, in turn, aim to produce strategic change that allows the organisation to remain relevant within ever-evolving environments (Helfat and Winter 2011; Schilke et al. 2018; Winter 2003). They are thus associated with organisational activities dedicated to promoting and supporting innovation, such as new product development and alliance formation (Eisenhardt and Martin 2000), but also higher-order capabilities such as learning (Ambrosini et al. 2009; Zollo and Winter 2002) and decision-making

rules (Bingham et al. 2015; Teece 2007, 2020). Moreover—despite this being a point of dispute (Zahra et al. 2006)—Dynamic Capabilities are considered especially relevant in dynamic environments, that is, to produce the necessary changes to rapidly respond to external challenges (Ambrosini and Bowman 2009; Teece et al. 1997; Teece 2016, 2020; Wang and Ahmed 2007; Zahra et al. 2022). In fact, Ambrosini et al. (2009) highlight that the initial rationale for developing the concept of Dynamic Capabilities derived from a concern that the RBV was not dynamic.

Table 1. Definitions of Dynamic Capabilities.

Authors	Definitions of Dynamic Capabilities
Teece et al. (1997, p. 516)	"We define dynamic capabilities as the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments."
Eisenhardt and Martin (2000, p. 1107)	"The firm's processes that use resources—specifically the processes to integrate, reconfigure, gain and release resources—to match and even create market change."
Zollo and Winter (2002, p. 340)	"A dynamic capability is a learned and stable pattern of collective activity through which the organisation systematically generates and modifies its operating routines in pursuit of improved effectiveness."
Winter (2003, p. 991)	"…one can define dynamic capabilities as those that operate to extend, modify or create ordinary capabilities."
Zahra et al. (2006, p. 918)	"Dynamic Capabilities as the abilities to reconfigure a firm's resources and routines in the manner envisioned and deemed appropriate by its principal decision-maker(s)."
Wang and Ahmed (2007, p. 35)	"We define dynamic capabilities as a firm's behavioural orientation constantly to integrate, reconfigure, renew and recreate its resources and capabilities and, most importantly, up-grade and reconstruct its core capabilities in response to the changing environment to attain and sustain competitive advantage."
Helfat et al. (2007, pp. 1, 4)	"A dynamic capability is the capacity of an organisation to purposefully create, extend, or modify its resource base."
Barreto (2010, p. 271)	"A dynamic capability is the firm's potential to systematically solve problems, formed by its propensity to sense opportunities and threats, to make timely and market-oriented decisions, and to change its resource base."

The literature on Dynamic Capabilities has grown remarkably over the last few decades, making it one of the most used theoretical frameworks in the field of strategy, and has been applied also in such areas as human resource management, operations management, international management, information systems, and technology and innovation management (Barreto 2010; Schilke et al. 2018). Several contributions have been added in terms of Dynamic Capabilities' dimensions, development mechanisms, antecedents, outcomes, moderators, and microfoundations. Some points of contention have also led to heated debates, giving rise to numerous calls for clarity and consistency. The most prominent of these tensions relates to the lack of clarity and consensus about the concept itself (e.g., Barreto 2010; Di Stefano et al. 2014; Winter 2003); the (more or less) direct (or even necessary) link with superior performance and (sustainable) competitive advantage (e.g., Helfat and Winter 2011); the degree of idiosyncrasy and heterogeneity of Dynamic Capabilities (e.g., Peteraf et al. 2013); and the role of environmental conditions (namely, the level of market dynamism) for the relevance of Dynamic Capabilities (e.g., Zahra et al. 2006). Several reviews of the Dynamic Capabilities literature have covered these conceptual contributions and contradictions (e.g., Ambrosini and Bowman 2009; Barreto 2010; Peteraf and Tsoukas 2017; Wang and Ahmed 2007; Zahra et al. 2006) and, especially more recently, the empirical work produced (e.g., Schilke et al. 2018; Leemann and Kanbach 2021; Wang and Ahmed 2007).

One such central paradox yet to be settled is how to reconcile the notion of Dynamic Capabilities as stable and persistent patterns of behaviours (such as rou-

tines) with their dynamic nature and the change they are expected to bring about to meet the demands of ever-more dynamic environments (Salvato and Rerup 2011; Salvato and Vassolo 2018; Schilke et al. 2018; Schreyögg and Kliesch-Eberl 2007; Wang and Ahmed 2007; Wenzel et al. 2021). Some scholars sustain that capabilities (and therefore also Dynamic Capabilities) must always be based on "a learned and stable pattern of collective activity" (Zollo and Winter 2002, p. 340), arguing that reliable performance can only be ensured through regular and predictable behaviours learned from past experience and perfected through repeated practice (Bingham et al. 2007; Helfat et al. 2007; Helfat and Winter 2011; Winter 2003; Zollo and Winter 2002). Others, in turn, suggest that, particularly in high-velocity contexts, Dynamic Capabilities can also be based on other, less structured and repetitive processes, such as "simple, experiential, unstable processes that rely on quickly created new knowledge and iterative execution to produce adaptive" (Eisenhardt and Martin 2000, p. 1106) and "emergent learning processes and simple organizing principles" (Rindova and Kotha 2001, p. 1274). Indeed, Teece (2012) argues that "creative managerial and entrepreneurial acts (e.g., creating new markets) are, by their nature, strategic and non-routine, even though there may be underlying principles that guide the choices" and that "many strategic actions and transformations require actions that one may never replicate" (p. 1397). In short, there remain two distinct positions that represent the opposing ends of this paradox (Di Stefano et al. 2014; Schilke et al. 2018): one camp insists on Dynamic Capabilities as routines, whereas the other argues that non-routine elements (such as "simple rules") are important in rapidly changing environments.

Some attempts have been made to address this paradox. Most offer a contingency solution, suggesting that stable routines are more appropriate in some circumstances while simple rules are better in others. Eisenhardt and Martin's (2000) seminal contribution pointed to a contingent approach when they proposed that complex routines relying on accumulated knowledge are appropriate in moderately dynamic environments, whereas in high-velocity markets Dynamic Capabilities rely on "simple rules and real-time knowledge creation" (p. 1113). A contingency view is also proposed by Ambrosini et al. (2009), who associate "incremental" Dynamic Capabilities (that continuously improve the current resource stock without replacing it) with stable environments, "renewing" Dynamic Capabilities (which create or introduce new resources) with dynamic environments, and "regenerative" Dynamic Capabilities (that modify the current Dynamic Capabilities themselves) with hyper-dynamic environments. These approaches do not, however, address how routines and simple rules can be combined.

There are a few conciliatory models that highlight the complementarities between routines and simple rules. These are more promising in terms of reconciling the paradox, but they are not altogether convergent. Di Stefano et al. (2014) offer a sophisticated proposal to reconcile the views of 'Dynamic Capabilities as complex routines' versus 'Dynamic Capabilities as simple rules' by exploring the metaphor of a bicycle drivetrain. The drivetrain's front gears "can be thought of as the simple rules, which are selected and controlled by the organisation's top management (the rider). They transmit power to the freewheel [in the back], which represents the set of more numerous complex routines that the organisation deploys internally to create and manage change" (pp. 318–19). Together, the front gears (simple rules) and the back gears (complex routines), linked by the chain, form a complex dynamic system that allows stable and adaptive processes to operate simultaneously in a complementary manner. Under turbulent conditions, the simple rules devised by top managers provide clear guidance and narrow potential targets, so that operational teams can then act upon the selected opportunities using established complex routines. Regrettably, the authors do not provide concrete examples for "the chain [that] represents the linkages that coordinate the two levels of action" (p. 319). Although compelling, this metaphor also cannot account for the frequent improvisational problem-solving involved in the enactment of Dynamic Capabilities by operational teams described in many empirical studies (e.g., Biesenthal et al. 2019; Magni et al. 2013; Salvato 2009). In fact, contrasting proposals based on empirical findings have been forwarded. Namely, Wohlgemuth and Wenzel (2016),

based on a quantitative study of small German manufacturing firms, maintain that the 'simple rules' versus 'complex routines' debate can be "de-paradoxified" by considering Dynamic Capabilities at different organisational levels (strategic or operational). In particular, they find higher levels of routinization at the strategic level and lower levels of routinization at the operational level. Similarly, drawing on evidence from project-based companies, Biesenthal et al. (2019) propose that Dynamic Capabilities are more akin to stable routines at the organisational level, and more based on flexible and adaptive behaviour at the operational project level.

Despite these apparent contradictions, models such as these are especially compatible with a view of stability and change as a duality rather than dualism. This implies looking at stability and change as different and not necessarily opposite or incompatible elements, but rather interdependent and mutually enabling (Farjoun 2010).

3. The Oppositional Tendencies of the Dynamic Capabilities Duality

3.1. Dynamic Capabilities as Stable Routines

Winter and his colleagues played a central role in establishing routines as the basis of Dynamic Capabilities (Wenzel et al. 2021). For example, Winter (2003) defined an organisational capability as "a high-level routine (or collection of routines)" and emphasised this element, clarifying that a "'routine' [is] behaviour that is learned, *highly patterned*, *repetitious*, or quasi-repetitious" (p. 991, emphasis added). He defined Dynamic Capabilities as "those [capabilities] that operate to extend, modify or create ordinary capabilities." (p. 991) and considers them "similar to capabilities in that they involve *patterned activity* oriented to relatively specific objectives" (p. 992, emphasis added). Similarly, Zollo and Winter (2002) wrote, "A dynamic capability is a *learned and stable pattern of collective activity* through which the organisation systematically generates and modifies its operating routines in pursuit of improved effectiveness" (p. 340, emphasis added).

This view has arguably become dominant within the Dynamic Capabilities literature and routines have been firmly established as "building blocks" of Dynamic Capabilities (Becker 2004; Dosi et al. 2000; Howard-Grenville and Rerup 2016; Salvato and Rerup 2011; Schreyögg and Kliesch-Eberl 2007). Indeed, extensive research confirms the positive association between higher performance and knowledge accumulated through experience and the regular and repeated exercise of capabilities (e.g., Bingham et al. 2007; Winter 2003; Zollo and Winter 2002). Established routines that help a firm reliably and systematically sense, seize and transform its resource base will set that firm apart from competitors that do not perform these activities.

Eisenhardt and Martin (2000) identify some specific activities as important elements of Dynamic Capabilities, including cross-functional R&D teams, new product development routines, quality control routines, technology and/or knowledge transfer routines, and certain performance measurement systems. Leemann and Kanbach's (2021) taxonomy of specific Dynamic Capabilities derived from empirical research also points to several routinised Dynamic Capabilities, such as screening opportunities and risks based on institutionalised and regular analysis of customers, competitors, the market, and technology, in addition to routines and processes to acquire knowledge and disseminate it within the firm.

In fact, the literature on organisational innovation has long endeavoured to identify the practices that ensure the best results in terms of innovation. For example, Galbraith (1982) contended that specific organisational design elements were required to sustain innovation, arguing for the need to institutionalise specific roles, units, processes and reward systems devoted to innovation. More recently, research has pointed to specific innovation capabilities, such as systematic customer involvement, assessment of potential value, and new product/service development processes, that help organisations sense and seize opportunities to reconfigure their operations (e.g., Kindström et al. 2013; Strønen et al. 2017; Yam et al. 2010).

These capabilities based on accumulated knowledge and experience are usually built in-house over time, but can also be imported from the outside when an organisation is confronted with the need to rapidly adjust to changes in the environment and lacks the requisite capabilities. Even though adjustments to the local context must inevitably be made, Dynamic Capabilities previously routinised elsewhere can be newly introduced through vicarious learning from similar organisations, sub-units or teams, or by hiring consultants or new CEOs (Ambrosini et al. 2009; Teece 2012).

In sum, it is well established, and not contested, that certain (stable) routines directed at change, built over time and drawing extensively on accumulated knowledge, can constitute Dynamic Capabilities. These stable mechanisms guide the innovation process "by reducing uncertainty, promoting coordination, and channelling energy in productive directions" (Farjoun 2010, p. 212).

3.2. Dynamic Capabilities as Non-Routine

Despite the role of stable routines in Dynamic Capabilities, just as core capabilities can become core rigidities (Leonard-Barton 1992), routines can become a source of rigidity. Because of the dynamic nature of the context in which Dynamic Capabilities are supposed to be more relevant, it is very likely that behaviours that have not yet been routinised play a crucial role. Routines are inherently characterised by patterned interactions, recurrence and regularity (Becker 2004). Routines are "build on the past" (Becker 2004, p. 653) and are a form of organisational memory, a store of knowledge from previous experience (Annosi et al. 2020; Howard-Grenville and Rerup 2016; Levinthal and Rerup 2006; Moorman and Miner 1998; Schreyögg and Kliesch-Eberl 2007; Zollo and Winter 2002). New situations, dissimilar from past experiences, are unlikely to fully benefit from this accumulated knowledge (Bingham et al. 2007). In very dynamic environments, highly scripted routines and contingency plans may become ineffective (Bingham et al. 2015; Magni et al. 2013) as their automatic recursive reproduction, based on the positive feedback loops generated by successful past experiences, locks the organisation into these well-honed capabilities, narrowing the alternatives considered and originating rigidities (Becker 2004; Leonard-Barton 1992; Schreyögg and Kliesch-Eberl 2007; Strønen et al. 2017). Instead, responding to new challenges may require "frame-breaking approaches" (Schreyögg and Kliesch-Eberl 2007, p. 924) that are beyond the firm's established repertoire of routines (Zahra et al. 2006). In highly volatile markets, opportunity capturing heuristics (Bingham et al. 2007), meaning simple and flexible rules that guide the selection and execution of opportunities, are not only more prevalent (Eisenhardt and Martin 2000; Rindova and Kotha 2001) but have also been shown to be more effective and therefore "central to the structure of capabilities" (Bingham et al. 2007, p. 40). Indeed, it has long been proposed that standardised and formalised structures, while efficient under stable conditions, become more unreliable in the face of complex, ambiguous and unstable environments (e.g., Chandler 1962; Lawrence and Lorsch 1967). Rather, the ability to operate under uncertainty, and to sense and seize unplanned opportunities, is favoured by flatter, more flexible and informal structures that allow for adaptative capacity (Annosi et al. 2020) and foster tolerance for novelty and openness to serendipity (Fultz and Hmieleski 2021).

As such, "routines are not the only building blocks of capabilities" (Dosi et al. 2000, p. 4). In addition to more stable routines directed at change, Dynamic Capabilities can also be based on a series of more sporadic, emergent processes that allow firms to adapt to environmental dynamism and consistently deliver the intended results. While not addressing how they co-exist with routines, a stream of the literature identifies non-routine individual and collective behaviours that allow organisations to swiftly reconfigure their resources and capabilities to adjust in high-velocity environments. These include serendipity (Fultz and Hmieleski 2021), creative managerial and entrepreneurial acts (Katkalo et al. 2010), entrepreneurial initiatives by managers and employees that promote innovation and adaptation (Zahra et al. 2022), as well as other elements, such as artifacts like software programmes or technological devices (Dosi et al. 2000; Leonard-Barton 1992;

Narduzzo et al. 2000) and special equipment or facilities (Teece 2012). Most of all, these authors sustain that the changes involved in Dynamic Capabilities *require* non-automatic, mindful behaviours, such as managers' attention, foresight and leadership, as well as front-line employees' ability to sense opportunities and threats first (Levinthal and Rerup 2006; Rerup 2009; Salvato and Rerup 2011; Salvato and Vassolo 2018; Vogus and Rerup 2018; Zahra et al. 2022). They highlight the role of conscious human agency through mindful interpretation and deliberate action (Fultz and Hmieleski 2021; Salvato and Rerup 2011; Salvato 2009; Rindova and Kotha 2001; Teece 2012; Wenzel et al. 2021) in transforming existing routines and disrupting the established order (Feldman and Pentland 2003; Howard-Grenville and Rerup 2016; Katkalo et al. 2010), thereby avoiding the rigidities introduced by routines (Bingham et al. 2015; Heimeriks et al. 2012).

Instances of these non-routine behaviours that are central to Dynamic Capabilities (Bingham et al. 2007; Gong et al. 2005) abound, particularly in empirical research. For example, in their study of companies managing portfolios of multiple projects in dynamic environments, Biesenthal et al. (2019) show how formally instituted change routines, such as planned regular forums and formal lessons-learned reports, coexisted with "individual, context-specific decision making [...] with little prescription and much agency" (p. 360). Studying a new research institution, Rerup and Feldman (2011) also identify "broad-based organisational actions that were not routines" as they were "not part of day-to-day operational tasks and were not repetitive" but were nevertheless relevant for the desired outcomes (p. 584). Magni et al. (2013), in turn, reveal how team improvisation was more prevalent than institutionalised routines in the highly knowledge-intensive and inherently complex context of software development, as successful new product development relied decisively on "a high degree of unplanned action by team members" (p. 1011) and the ability of team members to find solutions to emergent problems and incorporate extemporaneous inputs from end-users.

It therefore follows that a firm's capacity to create, extend or modify its resource base must also rely on non-routine behaviours and processes, especially in hyper-competitive environments.

4. The Contribution of Research on Improvisation and Routine Dynamics

The literature on improvisation has much to offer in understanding how non-routine behaviour can be crucial to attaining intended outcomes under conditions of uncertainty and disruption, when strictly following the established routines will not deliver the desired results.

Improvisation can be minimally defined as "the deliberate and substantive fusion of the design and execution of a novel production" (Cunha et al. 2016, p. 560; Miner et al. 2001, p. 314), which includes the dimensions of extemporaneity (design and execution of actions converge in time and substance), intentionality (actions are deliberate and conscious) and novelty (actions are new) (Cunha et al. 2016; Fultz and Hmieleski 2021). This contrasts with inaction, or with actions that represent the enactment of a plan or an established routine or habit (Miner et al. 2001). So, improvisations are actions that people deliberately decide to perform in the face of some unexpected event that requires urgent response and that departs from the usual course of action because that is perceived to be inadequate under the novel circumstances (Ciuchta et al. 2021; Cunha et al. 1999; Cunha et al. 2016; Moorman and Miner 1998). Action is conceived as it unfolds rather than as a result of analysis and planning (Cunha et al. 2016; Moorman and Miner 1998).

The literature on improvisation highlights the role of 'limited' (Brown and Eisenhardt 1997) or 'minimal' structures (Cunha et al. 1999), which can take the form of clear visions and priorities (Brown and Eisenhardt 1997), dominant logics (that encompass specific assumptions, priorities, and belief systems) (Kor and Mesko 2013), or decision heuristics to select and execute opportunities (Eisenhardt and Martin 2000; Bingham et al. 2007). They can be guided by "leadership (strong or subtle) and shared values (e.g., through strong cultures)" (Farjoun and Fiss 2022, p. 357). By focusing people's attention and efforts

(Kor and Mesko 2013; Rerup 2009) in the midst of a profusion of unexpected information, minimal structures act as information filters (Kor and Mesko 2013) and guide organisational actors to pursue (as yet) unpatterned and ground-breaking behaviour, instead of being paralysed by uncertainty or acting randomly (Mamédio et al. 2022).

In addition to minimal structures, the ability to learn in real-time is essential. Short-term learning enables action to be assessed and re-adjusted as it unfolds (Mamédio et al. 2022; Miner et al. 2001; Eisenhardt and Martin 2000). Longer-term learning occurs when firms are able to selectively recognise, retain and replicate successful improvisation into the organisation's artifacts, processes, and knowledge (Miner et al. 2001), in what Mamédio et al. (2022) label 'reassessment'.

In sum, improvisation can "be an effective mechanism for surviving and thriving in such [turbulent] environments." (Cunha et al. 1999, p. 333) and some companies are able to repeatedly and successfully introduce new products in the market through improvisation (Brown and Eisenhardt 1997).

Despite the importance of improvisation to strategizing in highly dynamic environments (Mamédio et al. 2022), most research—especially empirical research, some of which is presented ahead—depicts occurrences of improvisation at the operational level, where it is more pervasive (Cunha et al. 2016). Often, these instances are precursors to establishing routines, or they occur within established routines, as organisational actors adjust the performance of prescribed routines to their specific time and circumstances (Cunha et al. 2016; D'Adderio 2014; Feldman and Pentland 2003; Howard-Grenville and Rerup 2016). This points to the dynamic nature of routines themselves.

The dominant scholarship on routines sees them as whole entities or units of analysis, thereby neglecting the fact that they are complex, generative systems with internal dynamics (Feldman and Pentland 2003; Howard-Grenville and Rerup 2016; Rerup and Feldman 2011). Mirroring this, research on Dynamic Capabilities follows a 'black-box' approach that hides its internal dynamics (Howard-Grenville and Rerup 2016; Wenzel et al. 2021).

However, more recent research exploring the origins and development of Dynamic Capabilities has led authors in this field to examine the literature on the internal dynamics of routines and their underlying microprocesses, which have also gained more recent attention owing in great part to empirical studies. In particular, those taking a practice-based/process perspective, emphasising the centrality of action, agency, and performativity in organisational routines (Howard-Grenville and Rerup 2016; Peteraf and Tsoukas 2017; Schreyögg and Kliesch-Eberl 2007), portray them as continuously 'becoming', or coming into being through each performance (Schreyögg and Kliesch-Eberl 2007; Wenzel et al. 2021). They uncover how routines evolve and may in fact be less repetitive and stable than expected. For example, studying the development of installation and maintenance capabilities by skilled network technicians in a cellular phone company, Narduzzo et al. (2000) observe they seldom found repetitive behaviour. In fact, despite the existence of standardised procedures, they posit that "a certain degree of flexibility seems to be a relevant component of skilled action" (p. 47), as technicians 'spontaneously re-engineered' standard procedures, rearranging and reassembling the sequence and division of labour of prescribed activities to accommodate contextual events (e.g., delays) and novel situations.

Moreover, a number of empirical studies show how the enactment of routines and capabilities enclose elements of ad hoc problem-solving to varying degrees. Turner and Rindova (2012) found that, to deliver consistent service to customers, waste collection crews engaged in numerous micro-adaptations to the established routines. Studying the more complex context of project management in education, government and IT organisations, Biesenthal et al. (2019) showed that prescribed project routines were followed to the extent that they fit the intended purpose, but would also often be *ostensively* performed, i.e., performed as a "ticking of the box exercise" (p. 362) while in practice individuals "engage in courses of action they consider most helpful, irrespective of prescribed rules or systems." (p. 361). Several other studies depict similar episodes where employees combine automatic reproduction of the prescribed routines with more mindful

and deliberate deviations considered necessary to effectively achieve the desired results (e.g., Annosi et al. 2020; Bigley and Roberts 2001; Heimeriks et al. 2012; Salvato 2009; Sonenshein 2016; Turner and Rindova 2012). Rather than considering these variations observed in routine performance as negative (because they stray from the rule), this research finds that in most instances these deviations 'get the job done' as they allow procedures and behaviours to be adapted to the specific circumstances in which they are put into practice.

The distinction between the *ostensive* and the *performative* aspects of routines and capabilities, introduced by Feldman and Pentland (2003), is useful to understand this. The ostensive aspect of a routine is the description of what it is and how it should be performed. It is therefore an "abstract, generalized idea of the routine" (Feldman and Pentland 2003, p. 101) in the form of procedures, rules or prescriptions that can be codified into written documents (or supported by artifacts such as manuals, software, etc.) (Bingham et al. 2015; Feldman and Pentland 2003; Howard-Grenville and Rerup 2016; Schreyögg and Kliesch-Eberl 2007; Zollo and Winter 2002). The performative aspect, on the other hand, refers to each enactment of the routine and thus corresponds to "specific actions, by specific people, in specific places and times" (Feldman and Pentland 2003, p. 101).

The unique features of the context shaped by these specific people, places and times in which routines and capabilities are enacted require varying degrees of adaptation. Instances of improvisation may range from mere "embellishments of daily practice" (Cunha et al. 2016, p. 6) to full "action template re-design" (Cunha et al. 2016, p. 9), where plans and routines are substantially changed during execution. These performative variations do not necessarily change the ostensive aspect of the routine when they are purely circumstantial and not repeated. However, they can sometimes be later reflected in changes to the routine's ostensive aspect, when they become recurrent in practice (Rerup and Feldman 2011), are reflected upon (Bucher and Langley 2016), and represent a more substantial deviation that can even be retrospectively codified (Biesenthal et al. 2019; Salvato 2009). In any case, the performative aspect of a routine is more fluid, while the ostensive aspect tends to be more stable over time.

5. A New Way of Looking at Dynamic Capabilities

5.1. Reliable Outcomes vs. Stable Mechanisms

It is well established that Dynamic Capabilities rely on well-honed routines that organisations have developed over time to monitor their environment and identify opportunities and threats, assess and select the best opportunities in which to invest, and deploy the necessary resources and capabilities to pursue those opportunities (Helfat and Winter 2011; Schilke et al. 2018; Schreyögg and Kliesch-Eberl 2007; Winter 2003; Zollo and Winter 2002).

It is also recognised that improvisation is just as likely as innovation routines to enable firms to produce the change needed to adapt to dynamic environments, and probably even more so in highly volatile contexts (Bingham et al. 2007; Ciuchta et al. 2021; Cunha et al. 1999). In some instances, mindful improvisation can be the only way to respond effectively to time-dependent, complex and unstructured tasks (Bigley and Roberts 2001; Magni et al. 2013; Mintzberg and McHugh 1985). Moreover, as manifest in the empirical evidence cited above, the performance of routines frequently involves improvisation to achieve the desired results. In essence, in dynamic environments, "reliability requires variation" (Farjoun 2010, p. 203).

In addition, routinised and stable patterns of activity are not in fact a core element of the concept of Dynamic Capabilities (Gong et al. 2005). Several definitions of Dynamic Capabilities do not refer to routines or any kind of repetitive behaviour (see Table 1). Instead, elements in evidence are the firm's *ability* to achieve a certain *outcome* in an *intended way*. Most definitions refer also to the inherent mechanisms that operate on the firm's resources and operational capabilities (e.g., "create, extend, or modify its resource base", Helfat et al. 2007, p. 4). Some additionally specify the nature of the intended outcomes, namely to change in response to environmental dynamism (e.g., "to address rapidly changing environments" (Teece et al. 1997, p. 516)).

The notion of Dynamic Capabilities as based on repetitive and patterned behaviour stems from the need to ensure *reliability* in outcomes (Bingham et al. 2007; Schreyögg and Kliesch-Eberl 2007; Salvato and Rerup 2011; Schilke et al. 2018; Zahra et al. 2006). As Helfat and Peteraf (2003, p. 999) declare, "The concept of a capability as a set of routines implies that in order for the performance of an activity to constitute a capability, the capability must have reached some threshold level of practiced or routine activity. At a minimum, in order for something to qualify as a capability, it must work in a reliable manner. Taking a first cut at an activity does not constitute a capability." Concurring, Winter (2003) outright rejects ad hoc problem solving as a Dynamic Capability. Salvato and Vassolo (2018, p. 1731) argue also that "an organisation whose adaptation is disjointed, involving sporadic acts of creativity or ad-hoc problem solving to master problems only as they arise, is not exercising a DC [Dynamic Capability]". To be sure, not all change in organisations is the result of Dynamic Capabilities (Winter 2003). Sporadic, disjointed and accidental change, even if successful in responding to a specific market challenge, can be no more than a mere fluke. In addition, sheer luck does not constitute a Dynamic Capability (Ambrosini and Bowman 2009).

However, reliability in outcomes need not necessarily result from the repetitive nature of the underlying activities. According to Farjoun (2010), this notion is a misconception that conflates reliable mechanisms with reliable outcomes and is based on the assumption that reliable outcomes may only result from stable mechanisms. On the contrary, just as stable routines can bring about innovation, so too can extemporaneous, spontaneous and mindful actions result in consistent and reliable outcomes (Farjoun 2010). As Dosi et al. (2000) put it, "capabilities fill the gap between intention and outcome" and "to be capable of some thing is to have a generally reliable capacity to *bring that thing about as a result of intended action*." (p. 2, emphasis added). In fact, Helfat et al. (2007) add the expression "purposefully" to their "succinct and comprehensive definition" (p. 3) of Dynamic Capabilities "to reflect some degree of intent" and to distinguish them from "organisational routines, which consist of rote organisational activities that lack intent", as well as from accident or luck (p. 5). Thus, reliability in *outcomes as intended* seems to be at the crux of the matter, rather than the reliability of repeated actions. This is consistent with most definitions shown in Table 1. I side with Gong et al. (2005, p. 2) in arguing that an organisation can reasonably be considered to have a capability if it can "reliably accomplish particular classes of intended outcomes". *Intentionality* and the *dependability of the results*, rather than the repetitive nature of the activities performed, are key.

Precisely because the challenges posed by a high-velocity environment are new and unpredictable, even routines specifically geared towards innovation and change may prove inadequate. Some of the responses required will of necessity be also new and built to purpose, relying on the mindful and deliberate behaviours of individuals and teams. Processes built over time and lessons learned from the past may be insufficient and need to be complemented with (real-time) learning-by-doing acquired while dealing with new problems (Teece 2012; Zahra et al. 2006). Experiential activities such as prototyping, real-time information, and experimentation expedite such learning (Eisenhardt and Martin 2000). Zahra et al. (2006) argue that trial-and-error learning and improvisation, which are much less structured and routinised, are even more valuable when a firm must "invent" truly novel solutions in response to unexpected external stimuli. While some of these actions may in time be repeated and retrospectively routinised (Heimeriks et al. 2012; Gong et al. 2005; Salvato 2009; Zollo and Winter 2002), others will never be replicated, as new and different challenges arise (Teece 2012).

5.2. Dynamic Capabilities as a Duality

These arguments fit Farjoun's (2010) view of stability and change as a duality. The contrast between mechanisms and outcomes is useful to understand how improvisation can deliver reliable results, just as stable routines can deliver change. He explains how flexible mechanisms produce stable outcomes, and how stable mechanisms produce flexible outcomes.

Starting with how stable mechanisms can enable adaptability and exploration, research has identified several ways in which established routines can be advantageous for organisations' ability to pursue non-routine results. As discussed above, systematic innovation routines (e.g., new product development, knowledge management) offer reliable processes to bring about transformation. They establish boundaries, channel the creative efforts of teams and focus their attention towards finding solutions that are aligned with the organisation's ethos. Likewise, the mindful behaviour necessary in improvisation and the adaptive performance of routines can be sustained by routinised processes that promote attention, and prevent the mindless and rigid execution of routines (Levinthal and Rerup 2006). Reflexive practices such as post-project reviews (e.g., Bingham et al. 2015) and risk management practices such as those described by Heimeriks et al. (2012)—that directed project managers to analyse the idiosyncrasies of each project and consider alternative courses of action to the established routine—are examples of stable mechanisms that promote adaptability. So too are roles such as Rerup's (2009) *devil's advocate*—who highlights problems and alternatives, thereby increasing attention to variation—or Brown and Eisenhardt's (1997) *futurists*—whose job is to articulate visions of the future to guide innovation efforts and help anticipate otherwise unexpected events.

One central benefit to improvisation of having routines is the economy of cognitive resources: well-honed routines allow managers and employees to behave automatically in well-known situations, thereby freeing their attention along with their information-processing and decision-making capacity to deal with non-routine and unexpected issues (Becker 2004; Farjoun 2010; Levinthal and Rerup 2006). The constraints imposed by structures—such as routines—also stimulate individuals' imagination and creativity when faced with new situations (Sonenshein 2016). Moreover, available routines encompass "repertoires of action" that organisational agents can recombine and improvise with to rapidly respond to new situations (Levinthal and Rerup 2006; Salvato and Rerup 2011). The cell phone network technicians studied by Narduzzo et al. (2000) provide a good illustration of this as they rearranged and reassembled the sequence of actions within a procedure, using it as a checklist of activities while discarding the prescribed sequence. Routines thereby constitute a stable baseline for detecting the need for improvement and change, and act accordingly (Becker 2004; Farjoun 2010), providing security and consistency (Farjoun 2010), certainty and legitimacy (Becker 2004).

Conversely, flexible mechanisms can enable stability. Several empirical accounts, such as the ones related above about routine dynamics, sustain that flexible and adaptable performance is often required for the consistent outcomes of routines to be achieved. Indeed, this seems to be even more relevant in situations when ensuring reliable outcomes under unstable and unpredictable conditions is not only common but especially important, for example in high-reliability organisations such as emergency services or air traffic control (Farjoun 2010; Levinthal and Rerup 2006; Vogus and Rerup 2018). The COVID-19 pandemic crisis also perfectly illustrates this. Ciuchta et al. (2021) reveal how health professionals improvised when faced with the need to act urgently without any guidance from accurate information or specific guidelines about the new disease. In other words, they used whatever resources were at hand—in the shape of information gathering and sharing through social media, podcasts, medical blogs and text-message groups—to come up with solutions they could apply immediately. Waiting for peer-reviewed articles to be produced or clinical trials to be conducted—or, instead, becoming paralysed by their absence—would have had disastrous consequences.

As Farjoun (2010) argues, based on several studies on high-reliability organisations, maintaining reliable outcomes under "dynamic conditions require much more effort, re-

sources, and variety than achieving the same level of reliability in more stable, predictable settings" (p. 207). This is because under conditions of uncertainty, organisations are especially subjected to ambiguous stimuli that must be *mindfully* interpreted and categorised so that the appropriate course of action is selected (Levinthal and Rerup 2006; Salvato and Rerup 2011). Mindfulness, which is typical of improvisation (Levinthal and Rerup 2006), is thus one such flexible mechanism that will deliver more reliable outcomes than the less-mindful behaviour typical of routines (Levinthal and Rerup 2006). Mindfulness is essential to detect errors and (often weak) signals that intimate potential failure or unexpected events, prompting the necessary adaptation to performance that will deliver the intended outcomes, thereby ensuring reliability (Farjoun 2010; Levinthal and Rerup 2006).

Additionally, studies on routine dynamics also show that improvisation is a source of routine improvement and even new routine development as employees improvise in response to novel circumstances, and as managers mindfully retain and encode improvised performances that result in successful outcomes (Salvato 2009; Salvato and Rerup 2011). Gong et al. (2005), for instance, found that new ventures in highly dynamic industries often built new capabilities through improvisation while they "attempted to accomplish their goals using whatever behaviour in their repertoires appeared most appropriate at the time." (p. 7). Salvato (2009) also documented how executives at the Italian company Alessi purposefully encouraged creative variation of the new-product-development capability—for example, by organising multiple international workshops to discover young talent, and promoting in-house experimental projects—and then were attentive to the results of these experiments to selectively encode and replicate the improvements to the standard new-product-development routine resulting from the mindful improvisation of team members.

Looking at routines and improvisation as a duality rather than a dichotomy therefore highlights their interdependencies and enables us to consider them both as integral components of Dynamic Capabilities (Farjoun 2010; Smith and Graetz 2006). Empirical work can also be found that shows how routines and improvisation, although apparently contradictory, can in fact be interdependent. For example, Batista et al. (2016) depicted how emergency room doctors improvised to accommodate the specificity of each patient's idiosyncratic clinical condition and evolution, despite pressure to conform to the standardised routines prescribed by hospital protocols that conferred legitimacy and legal protection. To respond to cases that did not fall under the predictions of these protocols, doctors (especially more experienced ones) drew on their knowledge, previous experience and professional intuition to "improvise around protocols"; that is, doctors adapted their practice to the situation at hand while using protocols as guidelines that signalled the adequacy of procedures. This enabled them to register their improvised therapeutical approach in the patients' clinical records under the correct formula, thus complying with the protocols ex post. They thus both adjusted their performance to the idiosyncratic nature of each case and complied with the protocols that protected the organisation from legal action. Sonenshein (2016), in turn, studied routines in a large American clothing, jewellery and accessories retail chain that sought to foster each store's uniqueness to fit its boutique positioning while maintaining the chain's identity. He found that employees both followed chain guidelines and exercised their creativity in implementing them to achieve the *familiarity* of the retail chain and the novelty of each specific store. In more abstract terms, employees interpreted fixtures (such as mannequins, display tables, and props) and guideline documents (with ostensive depictions of routines) as incomplete, and combined them with their idiosyncratic backgrounds thereby *personalizing* routine enactment. At the same time, employees recognised the structure imposed by those artifacts that constrained their *intertwinement* with the routine, representing the counter mechanism of *depersonalizing*. Routines and creativity were thus not seen as antithetical, but rather as a *duality*, where "creativity is endogenous to and an outcome of routine performances" while "creative performances, although novel, also remain wedded to familiar conventions and traditions" (Sonenshein 2016, p. 753).

In sum, Dynamic Capabilities fulfil several of the characteristics of dualities (Ashforth and Reingen 2014). Namely, Dynamic Capabilities are both (and simultaneously) based on routines and improvisation. They are both beneficial and necessary to organisational change in contexts of high volatility, and the absence of either would curtail the organisation's ability to adapt to ever-changing environments. They are to an extent interdependent, in that routines free up time and cognitive resources needed for the non-automatic, mindful actions involved in improvisation; and varying degrees of improvisation are required for routines to be effectively performed. Routines and improvisation can thus be considered "mutually inclusive" (Smith and Graetz 2006). However, there are undeniable inherent tensions between maintaining the stable, predictable performance of routines and fostering extemporaneous spontaneous creative improvisation. Building effective Dynamic Capabilities to cope with high-velocity environments thus requires organisations to continuously and dynamically strive for the right balance between the efficiency of routines and the flexibility of improvisation, maintaining themselves at "*the edge of chaos*, a space where freedom and direction combine to produce creative outputs" (Cunha and Vieira da Cunha 2006, p. 847). A duality approach is therefore highly suitable to tackle this issue.

6. A Duality Model of Dynamic Capabilities

I propose a duality model that considers Dynamic Capabilities as comprising more stable (routines) and more flexible (improvisational) elements. Starting from the premise that the intended goal of Dynamic Capabilities is the reconfiguration of the firm's resources and capabilities to respond to the challenges of dynamic environments, Figure 1 depicts the end result of Dynamic Capabilities as reliably achieving these intended outcomes. To arrive at this, organisations need both to rely on the consistent performance afforded by systematic change routines, and the adaptability required to respond to unpredictable and unexpected challenges. Strategic improvisation—that is, the extemporaneous but intentional actions of organisational leaders who spot and seize opportunities or deflect challenges as they arise in volatile environments in the absence of analysis or planning (Baker et al. 2003; Mamédio et al. 2022)—contributes to this adaptable performance, ensuring that the intended outcomes are reliably attained when existing innovation routines are insufficient. Adaptable performance is also served by operational improvisation, which will likely take place to varying degrees within existing routines (Ciuchta et al. 2021; Cunha et al. 2016). Individuals and teams will improvise to adjust to the specific circumstances in which they enact existing routines (performative aspect) (Feldman and Pentland 2003; Howard-Grenville and Rerup 2016). This may eventually lead to changes in the ostensive aspect of those routines, sometimes culminating in the development of whole new routines. New routines may also be developed from strategic improvisation through processes of reassessment (Mamédio et al. 2022). Reflecting on the outcomes of improvised action, organisational leaders may either discard one-off performances that were not successful or, although effective in a specific situation, did not fit the organisational strategy and culture [dashed arrow]; or they may retain successful improvisations into the structure of the organisation [solid arrows] by codifying these actions—or improved versions—into new routines (Biesenthal et al. 2019; Salvato 2009). Improvised actions may also end up never being repeated because, even though they may have enabled the organisation to reconfigure its resources and capabilities to face specific circumstances, those circumstances may not re-occur due to the ever-changing nature of the environment (Teece 2012).
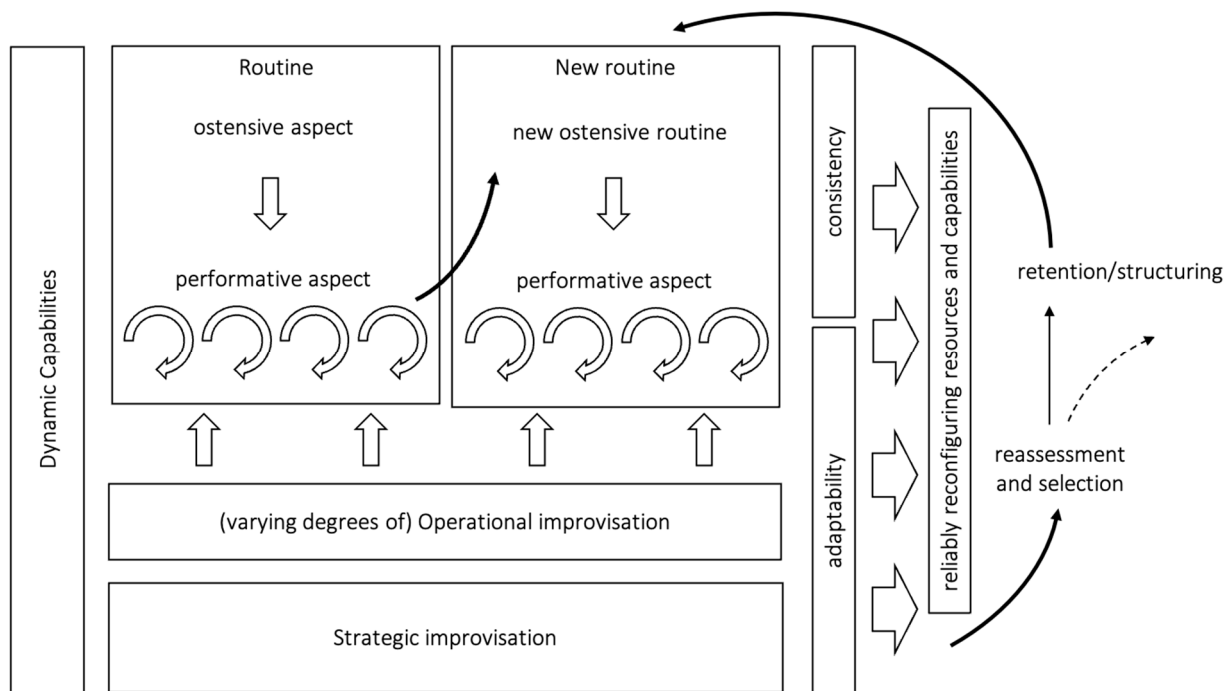
Figure 1. A duality model of Dynamic Capabilities.

7. Conclusions

In this paper, I have addressed one of the central paradoxes of the concept of Dynamic Capabilities: that Dynamic Capabilities are based on stable routines while fulfilling the purpose of producing the necessary change to deal with dynamic environments (Salvato and Rerup 2011; Salvato and Vassolo 2018; Schreyögg and Kliesch-Eberl 2007; Wenzel et al. 2021).

Integrating previous unconnected or seemingly incompatible contributions, and drawing on concepts that have not been applied to Dynamic Capabilities, I propose a duality perspective to reconcile this paradox. I argue that, in order to reliably achieve the required reconfiguration of their resources and operational capabilities as intended, organisations must combine and balance Dynamic Capabilities based on *both* stable routines and improvisation. Looking beyond the misconception that reliable outcomes can only be achieved through predictable performance (Farjoun 2010), I draw on the literature on improvisation, routine dynamics and high-reliability organisations to propose a duality model. This contends that ad hoc, mindful and creative actions are just as likely to be the basis of Dynamic Capabilities as tried and tested innovation routines. Both need to be nurtured and allowed to *surface* in organisations (Mintzberg and McHugh 1985), even though this entails accepting (and indeed even instigating) some degree of internal incongruence and contradiction (Farjoun and Fiss 2022; Smith and Graetz 2006).

Theoretically, this reinforces the need to study Dynamic Capabilities within a view of organisations as *complex adaptive systems* that encompass both order, structure and analysis on the one hand, and disorder, emergence and action on the other (Cunha and Vieira da Cunha 2006; Eisenhardt and Piezunka 2011; Farjoun 2010; Smith and Graetz 2006). These must be seen as two separate things rather than opposite poles of a continuum (Cunha and Vieira da Cunha 2006), enabling organisations to deal with them not as trade-offs, but as elements that must be managed concurrently and synergistically (Cunha and Vieira da Cunha 2006; Eisenhardt and Piezunka 2011; Farjoun 2010). In this sense, stability and change are fundamentally interdependent and contradictory, but also complementary and mutually enabling (Farjoun 2010). Organisations must continuously and dynamically strive for the right balance between efficiency and flexibility, relying on "multiple motors of adaptation that enable the firm to coevolve with changing environments" (Eisenhardt and Piezunka 2011, p. 507).

This complexity perspective affords a more realistic and comprehensive view of Dynamic Capabilities than the current dominant perspective.

The proposed model carries also some methodological implications, pointing to practice-based and process approaches as especially suitable to deal with phenomena permeated by complexity, contradiction and paradox (Langley et al. 2013), as is the case with Dynamic Capabilities (Peteraf and Tsoukas 2017). By emphasising action, agency, and performativity in organisational behaviour, these approaches foreground the micro-level actions of specific individuals and teams in the specific context in which Dynamic Capabilities are enacted (Howard-Grenville and Rerup 2016; Schreyögg and Kliesch-Eberl 2007; Vogus and Rerup 2018). The centrality of time, timing and sequence of events of process approaches to explain how phenomena unfold favour a view of Dynamic Capabilities as ongoing processes of *becoming* (Schreyögg and Kliesch-Eberl 2007; Wenzel et al. 2021), as well as accounting for "the uncertainty and urgencies inherently involved" in dynamic social practices (Langley et al. 2013, p. 4), that are quintessential to the highly volatile contexts in which Dynamic Capabilities are particularly valuable. For empirical studies, a practice-based/process view has the added advantage of focusing on observable actions (Di Stefano et al. 2014; Helfat et al. 2007; Wenzel et al. 2021), which not only mitigates the challenges of identifying Dynamic Capabilities in practice (Di Stefano et al. 2014), but also has the potential to produce theoretical models that are more immediately translatable to useful guidance for practitioners (Di Stefano et al. 2014). Most authors agree that inductive, longitudinal, qualitative and ethnographic studies are well suited to inform practice and process approaches (Helfat et al. 2007; Howard-Grenville and Rerup 2016; Wenzel et al. 2021).

Although I am proposing a conceptual model, the issues discussed have important implications for managerial practice. Organisational leaders should be encouraged to be comfortable with the complexity and paradoxical nature of their organisations, approaching them as complex adaptive systems. As they seek to power "multiple motors of adaptation" (Eisenhardt and Piezunka 2011) and create "edge of chaos" conditions to best deal with uncertainty and the unexpected, they need to accept—and perchance even stimulate—a certain amount of productive conflict, divergence and incongruence within their organisations (Farjoun and Fiss 2022). To keep the organisation from falling over "the edge of chaos", managers must combine dual, compensating mechanisms that, on the one hand, empower the swift and generative responsiveness of front-line employees, while, on the other, provide boundaries that maintain the stability and direction of the organisation (Smith and Graetz 2006).

Finally, as this paper is conceptual in nature, and despite incorporating the empirical findings of previous research, it carries the limitation of lacking empirical proof. The proposed theoretical model opens opportunities for future research to not only approach Dynamic Capabilities from a more complex and comprehensive perspective, but also to design empirical studies that may test the model and provide empirical support beyond the proposed theoretical arguments.

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