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Revisiting Exploration and Exploitation: Temporal structuring for innovation at work

Raghu Garud[1], Marja Turunen[2] and Arvind Karunakaran[3]

Abstract

Classical views on organizing for innovation suggest that exploration and exploitation can be balanced in ambidextrous organizations by first separating and then integrating the two. In this paper, we argue that exploration and exploitation can be intertwined to foster ongoing, distributed innovation throughout an organization. To develop this argument, we draw on literature from design, inspired by Herbert Simon, and from narratives, inspired by Paul Ricœur, to expand upon classical organizational views rooted in a representational perspective. From the design literature, we theorize the role of Kairos, or the opportune moment. From narrative theory, we theorize the role of Aion, a circular notion of time. These two concepts of time complement Chronos, a linear notion of time around which organizations have traditionally been structured. Our core thesis is that actors' ability to simultaneously engage in exploration and exploitation requires the structuring of all three notions of time. We then discuss the organizational implications of this thesis for innovation at work.

Keywords

ambidexterity, exploitation, exploration, innovation, temporal agency

[1]Pennsylvania State University, State College, PA, USA
[2]University of Turku, Turku, Southwest Finland, Finland
[3]Stanford University, Stanford, CA, USA

Corresponding author:
Raghu Garud, Pennsylvania State University, 431 BB, State College, PA 16802, USA.
Email: rgarud@psu.edu

Imagine an employee complaining about the functionality of existing email services, a situation that transpired early in Google's history. Upon hearing her complaints, Google's Paul Buchheit decided to develop an email prototype by repurposing existing codebase. By inviting others to investigate the prototype, Buchheit was able to demonstrate how it might be possible to address the issue raised by the first employee. This was the genesis of Gmail and then AdSense (see Garud & Karunakaran, 2018 for more details).

Now, imagine stumbling upon an unfamiliar substance during work, one with qualities opposite to what you were looking for. Most would ignore such a substance or discard it as an outcome of a misguided experiment. But not 3M's Spence Silver. Instead of ignoring or discarding it, Silver utilized his 15% company-sanctioned time to investigate its potential uses with help from others at 3M. This was the genesis of Post-it Notes (see Garud, Gehman, & Kumaraswamy, 2011 for more details).

These two vignettes showcase *innovation at work* wherein employees engage in exploration and exploitation simultaneously. Despite such possibilities, scholars have traditionally viewed exploration and exploitation in oppositional terms (March, 1991). This dualism has led scholars and practitioners to seek a balance between the two by separating and then integrating them over time and space to create ambidextrous organizations (e.g., Duncan, 1976; Raisch & Birkinshaw, 2008; Tushman & O'Reilly, 1996).

How can we view exploration and exploitation as intertwined; that is, a duality rather than a dualism? The benefits of doing so are evident: when employees can explore and exploit simultaneously, innovation is ongoing across the organization. We theorize that innovation at work is possible when employees cultivate a capacity to "reflect *in* and *on* action" (Schön, 1983). By reflection *in* action, we mean employees being open to novel ideas that emerge during opportune (or Kairotic) moments at work. Reflection *on* action is the ability to continuously review these ideas while also envisioning their potential usefulness as they are being developed. The latter is based on a circular view of time (Aion) involving attention, memory, and anticipation (Ricœur, 1984) besides the coordination of activities through chronological (Chronos) time.

By theorizing the structuring of work based on these three notions of time (i.e., Chronos, Kairos, and Aion), we extend research on this topic (see for instance Garud, et al., 2011; Kaplan & Orlikowski, 2013; Orlikowski & Yates, 2002; Otto et al., 2024; Pentland et al., 2025; Reinecke & Ansari, 2015) and contribute to the growing interest in temporal agency (e.g., Emirbayer & Mische, 1998; Pickering, 1993). Our theorization is informed not only by the two examples we introduced earlier (see Fisher et al., 2021 for phenomenon-based theorization), but also the insights we gleaned from the literatures that extend classical views on innovation within organizations (March & Simon, 1993). For instance, we draw from the literature on design (e.g., Boland & Collopy, 2004; Schön, 1983; Simon, 1996) to understand how novel ideas can emerge during Kairotic moments at work. We also draw from the literature on narratives (e.g., Ricœur, 1984) that informs us of a circular view of time involving attention, anticipation, and memory in the service of meaning making, which we label as Aion. Overall, we argue that innovation at work interweaves Chronos-based progressions of tasks with Kairos-based reflection in action and Aion-based reflection on action.

The paper is structured as follows. First, we present the *classical* view on organizing for innovation wherein scholars have suggested how organizations can strike a balance between exploration and exploitation. Then, drawing on the literature on design, we present a neoclassical view wherein the possibilities for individuals to explore while they exploit exists but can remain latent because exploration can disrupt exploitation. Noting that design is a polysemous term (Tharchen et al., 2020), we use the term in this paper to draw attention to the shaping of innovations and their environments through action involving artifacts

in-the-making (Schön, 1983; Simon, 1996). Next, drawing on the literature on narratives, we present a post-classical view wherein a continuous, yet non-linear, view of time makes it is possible to deal with the disruptions that can arise when employees explore when they exploit. We use the term narratives to draw attention to meaning making (Bruner, 1986) through temporal work (Ricœur, 1984). After introducing these three views on organizing for innovation, we discuss the implications of our theorization and conclude the paper with suggestions for future research.

Three Views on Organizing for Innovation

Classical view on organizing for innovation

In an influential article, March (1991, p. 71) distinguished between exploration and exploitation. Exploration includes practices such as "search, variation, risk taking, experimentation, play, flexibility, discovery, innovation." Exploitation includes practices such as "refinement, choice, production, efficiency, selection, implementation, execution." March concluded that "both exploration and exploitation are essential for organizations, but they compete for scarce resources. As a result, organizations make explicit and implicit choices between the two."

Taking stock of the work since March's 1991 article, Gupta et al. (2006) summarized the different approaches that scholars have proposed to address the tension between exploration and exploitation. The first is to consider these constructs along a continuum such that more of one means less of the other. Echoing March's (1991) sentiments, the authors noted that a balance must be struck between the two, especially given that organizations are designed to favor exploitation over exploration. One way to strike a balance is to temporally separate exploration from exploitation, which, according to Gupta et al. (2006), is best described as a punctuated equilibrium process.

Gupta et al. (2006) summarized a second approach in the literature to address the tension between exploration and exploitation, where the two constructs are considered orthogonal. This approach, labeled as structural ambidexterity, separates exploration from exploitation across organizational units (Benner & Tushman, 2003). Such separation requires units to possess "different competencies, systems, incentives, processes, and cultures—each internally aligned" (O'Reilly & Tushman, 2013, p. 192). The task of integrating the activities across these units falls upon top management (Heath & Staudenmayer, 2000; Lawrence & Lorsch, 1967).

These two approaches (i.e., temporal and structural separation), while valuable, are not without challenges. Temporally separating exploration from exploitation increases the risk of disruption for the company (Christensen, 1997). With such separation, executives may overlook temporal cues that prompt exploration, as they are more likely to focus on exploitation (March, 1991). For instance, so focused were disk drive companies on improving products for mainstream customers that they did not pay attention to emergent threats from niche markets where alternative product designs were being offered. Similarly, structural separation of exploration from exploitation gives rise to coordination and integration problems (Gibson & Birkinshaw, 2004). A well-known example is Xerox Corporation, a company that was unable to benefit from the inventions in computer technology that emerged from its research center at Palo Alto (PARC) that was structurally separated from its mainstream photocopying business (Smith & Alexander, 1998). As Heath and Staudenmayer (2000, p. 166) concluded, top managers at Xerox "failed to create coordination mechanisms that would integrate the innovations of the specialists into the mainstream business of the company."

Besides the challenges that can arise when firms attempt to balance exploration and exploitation through temporal and structural separation, neither of the two approaches discussed above is premised on exploration being a part of

exploitation, and vice versa. Failing to recognize such possibilities, organizations that temporally and structurally separate exploration from exploitation forgo opportunities to engage in distributed and ongoing innovation, which can be crucial for the survival and growth of firms in the long run.

Which leads us to ask: Is there an alternative approach that views exploration and exploitation as being intertwined? That such possibilities exist was foreshadowed by Gibson and Birkinshaw (2006) who noted that employees can decide how much time they spend between "alignment" (associated with exploitation) and "adaptability" (associated with exploration). Labeling their approach as "contextual ambidexterity," the authors argued that a supportive organizational context generates higher long-term business unit performance mediated by a meta-capability for ambidexterity at the individual level (see also Andriopoulos and Lewis, 2009). According to the authors, ambidexterity can permeate all business units and functions to the extent that such a supportive context exists.

Gibson and Birkinshaw's (2004) insights advance the literature on exploration and exploitation by drawing attention to individuals' judgment as to how they might allocate their time between "alignment" and "adaptability," an effort that Wilden et al. (2018) noted has remained undertheorized since March's (1991) foundational article. Yet, despite the potential to address the conundrum raised by March (1991), a dualism between exploration and exploitation remains. For instance, Gibson and Birkinshaw (2006, p. 211, emphasis added) offered this example: "In their day-to-day work, individuals often face choices as to how they should spend their time—should they continue to focus on an existing customer account to meet quota, ***or*** should they nurture a new customer who has a slightly different need?"

In this operationalization of contextual ambidexterity by Gibson and Birkinshaw (2006), the "either/or" challenge that March (1991) had raised between exploration and exploitation and the balance to be struck between them now reappears at the level of employees. In contrast, a "both/and" solution (Smith & Lewis, 2011, 2022) would consider the possibility of novel solutions emerging (exploration) in the very servicing of existing customers (exploitation) (see also Andriopoulos and Lewis (2009) for "tight" an "loose" coupling between a firm and its customers). Using March's (1991) terms, "discovery" and "innovation" are possible during "refinement" and "implementation." Moreover, these novel solutions, besides enhancing existing customers' experiences, can also serve as the basis for the identification of new customers with different needs. That is, exploration and exploitation are intertwined.

Based on these observations, we return to our orienting question motivating this paper—is there another approach to viewing the relationship between exploration and exploitation such that they do not appear antithetical but instead as two sides of the same coin?[1] Theorizing the possibility for such an approach requires a perspective that is different from the one that gave rise to the problem in the first place. In this regard, we argue that scholars have conceptualized exploration and exploitation as opposites because they adopted a "representational" perspective (Pickering, 1993) grounded in chronological notions of time. Viewed from this perspective, exploitation prevails over exploration as the former is based on accumulated knowledge, while the latter is about a future that is not yet known, the pursuit of which is risky (March, 1991). And it is to generate a balance between the two that March (1991) and others sought solutions.

Moving beyond this classical perspective, we draw on a non-representational "performative" perspective (Pickering, 1993; Schatzki, 1996) that allows us to see exploration as an integral part of exploitation and not apart from it. Specifically, we present a neo-classical view on organizing for innovation, drawing from the literature on design (e.g., Schön, 1983; Simon, 1996), and a post-classical view, drawing from the literature on narratives (e.g., Ricœur, 1984). These views highlight alternative conceptions of time beyond Chronos—namely, Kairos,

representing spontaneous, insightful moments, and Aion, representing a circular view of time.

Neo-classical view on organizing for innovation

The basis for a performative perspective underpinning what we label as the neo-classical view was already present in Simon's (1996 [1969]) *Sciences of the Artificial* in which he investigated design as efforts "at changing existing situations into preferred ones" (Simon, 1969, p. 55).[2] Signaling a shift from choice and decision making under conditions of bounded rationality (which led to dualism between exploration and exploitation), Simon drew attention to 'action' rationality rather than 'decision' rationality, noting that new insights emerge during the act of doing (see also Boland & Collopy, 2004; Brunsson, 1982; Joas, 2005). For instance, Simon (1996, p. 163) offered this analogy in his theorization of the design of artificial worlds:

> Making complex designs that are implemented over a long period of time and continually modified in the course of implementation has much in common with painting in oil. In oil painting every new spot of pigment laid on the canvas creates some kind of pattern that provides a continuing source of new ideas to the painter. The painting process is a process of cyclical interaction between painter and canvas in which current goals lead to new applications of paint, while the gradually changing pattern suggests new goals.

The quotation above highlights the emergence of novel ideas in action ("every new spot of pigment laid on the canvas creates some kind of pattern that provides a continuing source of new ideas to the painter"). However, the painter must be skilled in their craft to recognize the potential value of the novel ideas that emerge during the exercise of their skill. This is a point that Usher (1954) made by noting that "acts of insight" are embedded in "acts of skill." Stating Usher's point in a different way, exploration is a part of exploitation.

Moreover, the quote from Simon highlights the possibility of goals changing as the process unfolds based on the patterns that emerge (". . . current goals lead to new applications of paint, while the gradually changing pattern suggests new goals."). Pickering (1993, p. 559) theorized this temporal dimension of agency by drawing attention to the "dialectic of resistance and accommodation" that individuals encounter during work.[3] Pickering argued that dealing with these resistance and accommodations is an ongoing process, the outcomes of which transform the actors involved (i.e., their identities and their preferences) and the artifacts they work with (i.e., their functionality and the options they offer).

These ideas and Simon's insights on the sciences of the artificial based on design have spawned a stream of research labeled as the "design attitude" to organizing, where options and preferences emerge in and through action (see for instance Boland & Collopy, 2004, and, more recently, Garud & Karunakaran, 2018, Rindova & Martin, 2021).[4] As Boland and Collopy (2004) noted, Simon (1996, p. xii) was interested in how "Engineering, medicine, business, architecture, and painting are concerned not with the necessary but with the contingent—not how things are but how they might be—in short, with design." And he was interested in the role that human-made artifacts play in "connecting the 'inner' environment, the substance and organization of the artifact itself, and an 'outer' environment, the surroundings in which it operates."

Foremost among the scholars who contributed to the design attitude was Schön (1983), who offered the notion of "reflection in action." Often juxtaposed against "rational problem solving" (Dorst & Dijkhuis, 1995), Schön's (1983, p. 79) reflection in action captures the interactivity between the designers and the situations they confront. Schön noted:

> The designer may take account of unintended changes he has made in the situation by forming new appreciations and understandings and by

> making new moves. He shapes the situation in accordance with his initial appreciation of it, the situation 'talks back' and he responds to the situation's back talk.

Schon (1995, p. 247) further explained this interactive process by also introducing "reflection on action" noting:

> So reflection-in-action is the process by which a new response is generated in the situation, in response to surprise and under conditions of uncertainty, in a way that involves on-the-spot experimentation and that does not necessarily take place in words. Reflection on that process, however, does have to take place in words or at least in formal symbols. This reflection on reflection-in-action is an attempt to describe the knowledge that was generated and the conditions under which it was generated and the on-the-spot experimentation that was carried out. The two of these in combination–reflection-in-action and reflection on it-are, I think, a major part of what counts as artistry in practice.

While this quote offers several insights, here we dwell on the implications of reflection in and on action for exploration and exploitation. Reflection *in* action fosters exploration during exploitation, while reflection *on* action helps to exploit the outcomes from the exploration that took place during reflection in action. In combination, reflection in and on action lead to what we call "reflective knowing," which differs from tacit knowledge (Polanyi, 1996). Nonaka and Takeuchi (1995) theorized the importance of explicating tacit knowledge during innovation processes. We emphasize the significance of reflective knowing, which is a process of thinking, reflecting, and becoming aware of one's experiences during and after a situation (see also Yanow & Tsoukas, 2009).

Pertinent to the arguments we offer in this paper, reflective knowing locates innovation rights with employees. When encouraged to reflect in and on action, employees are more likely to question taken-for-granted assumptions and, in doing so, come up with novel ideas. As Schön (1983, p. 61) noted, novel ideas emerge and are acted upon as employees

> . . .surface and criticize the tacit understandings that have grown up around the repetitive experiences of a specialized practice and can [through reflection on action] make new sense of the situations of uncertainty or uniqueness which he may allow himself to practice.[5]

Similarly, MacLean et al. (2015, p. 343) observed that creative actions involve "situated individuals engag[ing] in purposive improvisation to resolve experienced difficulties."[6] This iterative process leads to "the continual co-evolution of aspirations, moves and tactics as the game ebbs and flows" (MacLean et al., 2015).

To illustrate these dynamics, we refer to the two examples we introduced earlier. In the Gmail case, reflection in action was evident in a Google employee asking why she could not see prior conversations aggregated upon accessing her emails, a query that prompted Buchheit to utilize his company-authorized "20% time" to explore new possibilities by exploiting the code he had written earlier.[7] In the Post-it Notes case, reflection in action was evident in Silver "want[ing] to see what would happen if [he] put a lot of it into the reaction mixture." Then, reflecting on the unexpected outcome, Silver found the microstructures of the substance he had serendipitously stumbled upon to be beautiful when he examined it under the microscope.[8]

Silver's act of serendipity was made possible by his preparedness, curiosity, and openness to surprise, qualities that enabled him to experience what we label as a Kairotic moment. Kairos refers to an intra-temporal opportune moment that is distinct from the more structured, Chronos-based inter-temporal moments often used to create predictable, routinized timelines (such as through project evaluation review technique (PERT) charts; Yakura, 2002). While individuals and collectives may prepare themselves for serendipity, such opportune moments cannot be scheduled in advance, as 3M's CEO George Buckley noted:

> Invention is, by its very nature, a disorderly process. You can't put a six-sigma process into that area and say, "well, I'm getting behind on

> invention, so I'm going to schedule myself for three good ideas on Wednesday and two on Friday." (quoted in Hindo, 2007)

Both cases highlight that just coming up with novel ideas is not enough. Instead, they must be developed and investigated[9] for commercial viability (Van de Ven et al., 1999). Prototyping plays an important role towards this end. Prototypes are semi-concretized manifestations of ideas that employees create to establish proof of concept (Schrage, 1999). Indeed, prototyping as a design practice makes it possible for employees to envision, investigate, and demonstrate their inventions to others, steps that are especially valuable when employees lack a vocabulary to articulate their tacit ideas (Cornelissen et al., 2015; Garud, 2021).

In the Post-it Notes case, an early prototype was a bulletin board coated with the weak glue on which paper could be temporarily tacked. Reflecting on this "intermediate artifact" (see Berglund et al., 2020, p. 830), Silver recounted, "It was just one of many ideas people started batting around." This option, which 3M did not pursue, nevertheless spurred discussions among 3M employees as to the potential use of the strange glue, which eventually led to Post-it Notes.

These dynamics are in line with Thomke's (2003, p. 1) observation that even if initial hunches are not confirmed, attempts at verification "fuels the discovery and creation of knowledge, [which] leads to the development and improvement of products, processes, systems, and organizations." In a similar vein, Usher observed: "Failures . . . are not solutions, but they are not without relation to a solution. They reveal explicit consciousness of the potentialities of some new mode of action, or of some new contrivance" (Usher, 1954, p. 70).[10]

At 3M, frequent prototyping and investigation are possible because of "bootlegging"—a cultural meme that encourages intrapreneurs to investigate possibilities by drawing on company-wide resources (Garud, Gehman, & Kumaraswamy, 2011). As Fry noted: "At 3M we've got so many different types of technologies operating and so many experts and so much equipment scattered here and there, that we can piece things together when we're starting off" (Nayak & Ketteringham, 1986, pp. 66–67).

However, benefiting from these resources during the emergence of Post-it Notes was not straightforward, as these resources had to be transformed (see related arguments by Xu & Carlile, 2024 on routine dynamics in a world in flux). For instance, manufacturing practices were modified to coat the weak glue onto the paper (Nayak & Ketteringham, 1986). The dynamics that unfolded demonstrate how the emergence of novelty within organizational contexts can lead to the transformation of the organization itself, which then shapes the paths of these innovations.[11]

Connecting these dynamics with Simon's (1996) notions of design as "not how things are but how they might be," individual and collective reflection in and on action intertwines exploration and exploitation across individual and organizational levels. However, these possibilities are dampened to the extent that organizations insist on individuals adhering to rigid chronologically scheduled temporal sequences.[12] Deviations from established routines will be disruptive and, so, will likely be selected out, thereby reducing the possibility of novel ideas emerging during work.

Simon's (1996) solution to this problem, illustrated by his example of two watchmakers, was to "nearly decompose" phenomena in a way that any disruption remains confined to the unfinished module within an overall architecture.[13] However, such modularization sacrifices flexibility and, more importantly, still treats all interruptions, including novel ideas, as disruptions to be avoided (see Garud et al., 2008 for arguments). Under these circumstances, even if novel ideas were to emerge, actors will try and shield them from the rest of the organization to protect them from organizational selection pressures. Ironically, an inability for these "hopeful monstrosities" (Basalla, 1988) to connect with resources distributed all over the organization makes it more difficult for employees to imagine and realize their possibilities.

In contrast, what if novel ideas emerging during work could be sustained without disrupting ongoing operations, and drawn upon at opportune moments when employees recognize their utility (Blagoev & Schreyögg, 2025; Garud & Nayyar, 1994; Otto et al., 2024)? One way to theorize this dynamic is by viewing novel ideas as "real options" (McGrath, 1997) that employees can call on at the right moment when the potential for their realization is high. This trans-temporal capacity to retain, incubate, and reactivate ideas implicates a notion of time that is different from Chronos and Kairos. Continuing with our reference to the Greek gods of time, we label this third notion of time as Aionic time, which is often depicted as a young man with wings attached to his temples standing in the circle of the zodiac to signify unbounded circular time. While Aionic time involves reflection on action, it also explicitly implicates imagination constituting temporal agency. As we argue in the next section, it is by considering Aion that *stretches time* along with Kairos that *disrupts time* and Chronos that *brackets time* that we can fully theorize exploration and exploitation being intertwined within and across the individual and organizational levels.

Post-classical view on organizing for innovation

In his paper titled *Research on Organizations: Hopes for the Past and Lessons from the Future*, March (1999, p. 77) argued that exploration is more likely when scholars consider both a long-term view of the future (exploration) and a long-term view of the past (exploitation), concluding, "When long histories and long futures are intertwined by a sense of continuity and development, they stimulate the pursuit of new ideas." In these arguments we see a shift in March's theorization about the relationship between exploration and exploitation since his foundational piece in 1991. Rather than consider them as oppositional, March argued that exploration and exploitation could be complementary if scholars inter-temporally reach back to go forward. March concluded, "If scholarship is seen as cumulating over time and over scholars in a way that makes past work a foundation but not a substitute for current work, individuals are more likely to undertake the risky, long-term projects that will contribute to such a dream."

To develop these ideas, March (1999) drew on work by Nuttin (2014 [1985]) who offered the notion of "time perspective." One of the ways that time perspective is measured, according to Nuttin (1985, p. 25), is through "creative expressions such as stories." Indeed, storytelling as a form of meaning making (Bruner, 1986, 1991) is a performative move that March (2010) later embraced in his book, *The Ambiguities of Experience*. In particular, he referenced Czarniawska's (2008, p. 33) work on storytelling: "When a new event occurs, . . . it is made meaningful by setting it in an existing frame, even if it may mean that the frame must be somewhat adjusted and changed."

Building on Czarniawska's (2008) insights and those offered by other narrative scholars (e.g., Bruner, 1986; Ricœur, 1984), we suggest that moments of insight or surprise associated with acts of exploration can disrupt the routine, skill-based activities that characterize exploitation. When an individual or collective encounters an insight (exploration) within the context of a structured, routine activity (exploitation), attention shifts. A prime reason is that these novel ideas may not fit into any established known pattern (Cunha et al., 2006). Consequently, they will require attentional resources of the actors who experience such events (Bruner, 1986, 1991).

This is where meaning making through narratives comes in. It is through narratives that employees generate meaning around the novel ideas they stumble upon (Gabriel, 2000; Garud, Dunbar & Bartel, 2011; Hernes & Obstfeld, 2022; Müller, 2013; Riessman, 1993). As Gabriel (2000, p. 41) noted, "Story-work involves the transformation of everyday experience into meaningful stories. In doing so, the storytellers neither accept nor reject 'reality'. Instead, they seek to mould it, shape it, and infuse it with meaning."

Specifically, to deal with the disruption that novel ideas can generate, individuals reframe their understanding of the moment, drawing on memory (experiences) and anticipation (imagination) (Ricœur, 1984). Speaking to a multiplicity of temporal horizons and possibilities that emerge, different evocations of memory can lead to different anticipations and imaginations, and vice versa. Each temporal horizon, in turn, can shape the meanings of the events being experienced by individuals.

These dynamics highlight exploration and exploitation as interconnected processes that unfold through a circular, non-linear flow of time involving memory, anticipation, and attention. We label the notion of time implicated here as trans-temporal Aionic time in comparison to inter-temporal Chronos-based durations or intra-temporal Kairotic time. Trans-temporal Aionic time is distinct from duration-based chronological time evoking the past, present, and future, or Kairotic time that actors may experience in the moment. Like a Moebius strip, trans-temporal Aionic time based on narratives is a synthesis of attention (what is happening), memory (experience), and anticipation (imagination), which are all co-constituted in the service of meaning making (Ricœur, 1984).[14]

Elsewhere, we have referred to this malleable property as the "plasticity of time" (Garud & Turunen, 2021). It is through the plasticity of time that ideas can be kept alive to be activated and recombined with others at opportune moments (Garud, Dunbar & Bartel, 2011). For instance, Pasteur's statement "chance only favours the mind which is prepared. . ." draws attention to the utility of preparedness and memory. In the context of exploration and exploitation, temporal plasticity also implicates imagination and anticipation besides memory.

For example, upon confronting a problem in the moment, Art Fry, another 3M employee, remembered Spence Silver's strange substance to imagine how the substance when applied on paper could create a place maker in his hymnbook. This Kairotic moment for Fry was made possible by the presence of Aion, i.e., the activation of memory and imagination by Fry, which led to Post-it Notes. Fry's act of serendipity cannot easily be categorized as either exploration or exploitation, as both were involved. To explore possibilities that did not exist to address a problem he encountered, Fry exploited what he knew about the discovery that Silver had made. Similarly, the interconnection between exploration and exploitation was also evident in the Gmail case. Through a process involving both memory and anticipation, Google's Buchheit developed a prototype based on code he had developed earlier to investigate the possibility of addressing a colleague's suggestion.[15]

A further investigation of narratives allows us to understand how employees enroll others in their initiatives by building on and contributing to the symbols in currency and texts in circulation (Dailey & Browning, 2014; Swidler, 1986). This intertextual property (Fairclough, 1992; Kristeva, 1969) contextualizes innovative narratives (Garud et al., 2014; Suddaby et al., 2023). The use of shared symbols and texts when these ideas are shared with others enhances cognitive legitimacy (Bartel & Garud, 2009; Suchman, 1995). Novel aspects of the narrative capture the imagination of audiences who transform the cultural resources as they engage (Bartel & Garud, 2009; Beckert, 2021; Taylor & Van Every, 2000, p. 43).

Overall, these mechanisms involve narratives activating the tacit knowledge of audiences and triggering reflective awareness in those who become involved. Because of such interpretive work, audiences and participants imagine different possibilities for the novel ideas based on the memories they generate. Interpretive flexibility (Pinch & Bijker, 1987) around technology as equivoque (Weick, 1990) amplifies ambiguity in beneficial ways. For instance, Pinch and Bijker (1987) described how different meanings around bicycles emerged as multiple social groups (such as bicycle race enthusiasts, women, and ordinary people) engaged. Interpretive flexibility is fueled by ambiguity making it possible for even peripheral actors (Sgourev, 2013) to "think-along" (Berends et al., 2011) with focal

actors to scope out the utility and value of novel ideas.[16]

The relational unfolding of an opportunity is readily evident in both the cases we introduced. In the Gmail case, Buchheit initially let the "code do the talking," which then spurred discussions between an ever-expanding set of users who became co-creators. In the Post-it Notes case, when asked "Whom did you tell?" Silver responded: "Anyone who would listen." It is because of this "path networking" (Pentland et al., 2025) that eventually resulted in Art Fry remembering the strange substance Silver had discovered, which then led to Fry's act of insight.

In both the cases, details highlight how novel ideas shared by individuals with others through narratives connected activities across the organization. In the Post-it Notes case, Silver described the overall process as "a slow crescendo of things, which is typical of the discovery process. Things build up, and you begin to see the options the discovery creates" (Lindhal, 1988, p. 14). As these options became clearer, 3M began dedicating resources and giving increasing prominence to Chronos even as other innovations unfolded to develop and refine Post-it Notes. Among others, these innovations included the redesign of machine tools for mass-scale production of paper with glue on one side and rethinking corporate practices for where the product would be used (Nayak & Ketteringham, 1986).

Overall, within organizations based on this post-classical view, employees can experience intra-temporal Kairotic moments that need not be disruptive because of the presence of Aionic trans-temporality through narratives. Narratives enable individuals, along with those involved, to make sense of potentially disruptive ideas that arise during work and keep them alive, activating them at the right moments, often through the combination of multiple initiatives unfolding across the organization. Indeed, narratives are the means for employees to "join in complicated networks of associations" involving "the actions of complex combinations of many individuals" (March, 2010, pp. 54–60). Explaining the importance of narratives, a 3M employee noted, "Stories are a habit of mind at 3M, and it's through them—through the way they make us see ourselves and our business operations in complex, multi-dimensional forms—that we're able to discover opportunities for strategic change" (Shaw et al., 1997; see also Tsoukas & Hatch, 2001 for related arguments).

Summary

We began by drawing attention to the tensions between exploration and exploitation as articulated by March (1991). Previous studies have used the term ambidexterity with qualifiers such as "structural," "temporal," and "contextual" to describe organizational approaches that balance exploration and exploitation. These classical organizational approaches, while valuable, nevertheless fall short of viewing exploration and exploitation as being intertwined. As a result, opportunities for employees to engage in ongoing innovation at work are diminished.

To theorize how exploration and exploitation can be intertwined, we went beyond classical views of the firm with insights from the literature on design (e.g., Schön, 1983; Simon, 1996) to propose a neo-classical view, and the literature on narratives (e.g., Ricœur, 1984) to propose a post-classical view. The literature on design offered insights on how employees can generate novel ideas during Kairotic moments to the extent they reflect in action. However, such possibilities are dampened if employees lack the capacity to generatively draw on memory and anticipation. Without this ability, they may fail to recognize the value of the novel ideas they encounter during work. Even if they did because of random luck rather than cultivated serendipity, developing these ideas could be challenging, as doing so might disrupt established, chronologically entrained routines.

To address these intra- and inter-temporal challenges, we discussed reflection on action involving trans-temporal narrative time where attention, memory, and anticipation are intertwined. Such a circular non-linear view of time, which we labeled as Aion, makes it possible for

individuals not only to visualize the value of potentially disruptive novel ideas but to also keep them alive by developing them to be activated at opportune moments. As an innovation trajectory gains momentum, Chronos starts playing an increasingly important role as activities now must be coordinated across multiple actors. But even within such chronologically entrained processes, Kairos and Aion continue playing a role, as subsequent innovations are required to commercialize the innovation.

Organizing for Ongoing Innovation at Work

To discuss how these observations inform organizing for innovation, we address March's call to explore organizational themes that stand in contrast to classical themes—namely *rationality*, *hierarchy*, *individual leadership*, and *historical efficiency*. In advocating for alternatives to these classical themes, March argued that garbage-can like processes (Cohen et al., 1972) are particularly important in today's dynamic environments. Since these processes align with our theorization on organizing for innovation, we discuss the implications of our observations against the classical themes that led to a view of exploration and exploitation in oppositional terms.

We begin with the first classical theme, i.e., rationality based on information processing, as it was the basis for March making the distinction between exploration and exploitation. Rationality based on information processing considers humans taking decisions and justifying them based on their consequences. Within firms organized around this theme, much attention is placed on enhancing managers' decision-making capabilities given bounded rationality (see Boland & Collopy, 2004). For instance, employees must justify the exploration of novel ideas using rational decision-making management tools (Cabantous & Gond, 2011). Under these circumstances, it may not be easy for employees to justify the pursuit of novel ideas based on management tools more in tune with exploitation such as the net present value (NPV) (Doganova, 2024) that undervalue real options. Consequentially, novel ideas that arise during work must be sheltered from "innovation killers" (Christensen et al., 2008) within units such as "skunk works" (Rich & Janos, 1994).

The neo- and post-classical views of the firm that we articulated are premised on action rationality (Boland & Collopy, 2004; Brunsson, 1982) involving meaning-making (Bruner, 1986, 1991), which serves as an alternative theme to decision rationality based on information processing. Action rationality involving meaning making based on narratives implicates reflection in and on action (Schön, 1983). To the extent they reflect in action, actors are more likely to recognize the challenges and opportunities they encounter during Kairotic moments, which, because of disruptions to ongoing routines, could potentially be ignored. Reflection on action, which evokes a circular view of Aionic time, makes it possible for the actors to creatively address these challenges and opportunities. Overall, to the extent that individuals reflect in and on action, exploration can be a part of exploitation.

How might organizations be designed to facilitate such possibilities? We summarize several practices that structured Chronos, Kairos, and Aion at 3M and Google during the development of Post-it Notes and Gmail. For instance, employees could use some portion of their chronologically entrained time (15% at 3M and 20% at Google)[17] to explore ideas they discovered during work without seeking management's permission. Additionally, both companies created spaces where employees' interactions could trigger attention, memory, and anticipation. At Google, there were spaces such as 'demo slams' where employees could demonstrate their prototypes (Garud & Karunakaran, 2018). By serving as boundary objects (Star & Griesemer, 1989) at these demo slams, prototypes would trigger attendees' memory and anticipation, enticing some to engage in the unfolding efforts.

At 3M, multi-purpose "technology platforms" created a "boundary infrastructure" (Bowker & Star, 1999) for individuals and

collectives to keep ideas alive (see also Blagoev & Schreyögg, 2025; Otto et al., 2024) and to imagine possibilities based on evoked memories (Garud, Gehman, & Kumaraswamy, 2011; Maclean et al., 2020).[18] Additionally, 3M had in place a repository of innovation narratives (e.g., 3M Innovation Chronicles), some authored by top management to induce rather than reduce variation with prompts such as "*Innovation means showing the insight and courage to take intelligent risks – to ask for forgiveness, if need be, rather than permission"* (see Burgelman, 2002 for details on how "induced strategies" are typically variation reducing). In combination, technology platforms and innovation narratives created an environment ripe for serendipity (Garud et al., 2018). Indeed, they illustrate how different kinds of organizational arrangements can trigger different notions of time, a topic worthy of further investigation.

The contrast that we drew between organizing for rationality and organizing for meaning-making has a bearing on two additional classical themes that March (2010) identified—hierarchy and leadership. As March (2010) noted, hierarchy is a natural byproduct of efforts to reduce complexity by "decomposing" an organization and its problems into bits and pieces (see also Carroll, 2006; Simon, 1996). In organizations designed around this principle, decision rights reside with management at the top of the organizational hierarchy, which March noted can suppress "network structures," key for ongoing distributed innovation, from operating.

In contrast, reflection in action, central to action rationality, assigns innovation rights to employees, resulting in the distribution of innovation efforts (Garud & Turunen, 2021). These distributed innovation efforts become interconnected through non-hierarchical networks (Czarniawska, 2004; Gehman et al., 2022) often through narratives (Bartel & Garud, 2009), events (Pentland et al., 2025), and digital technologies (Gruber et al., 2015; Zammuto et al., 2007). These non-hierarchical networks extend individuals' capacities by engendering collective reflection on action leading to "expandable rationality" (Hatchuel, 2001; Levina, 2005). Consequently, sole leadership as a theme is replaced by interactive complexity (March, 2010), which ensues when people across the organization interact with one another to generate, develop, and investigate new ideas, some of which turn out to be valuable (Jelinek et al., 2008; Yoo et al., 2006).[19]

The emergence of novel ideas during work (i.e., exploration during exploitation) is a counter theme to March's fourth traditional theme around efficiency. Emergence resonates with Simon's (1996) notion of design as attempts to change the existing situation into a more preferred one. It also resonates with literature on "organizational becoming" (Tsoukas & Chia, 2002) wherein scholars view organizations as entities in "flux and transformation" (Morgan, 1986) rather than as rigid "boxes-within-boxes" (March & Simon, 1993). Organizations in flux and transformation may sacrifice static efficiency to maintain dynamic efficiency. As a result, their performance should be evaluated *over time*, rather than at any one moment (Schumpeter, 1942).

Overall, these alternative themes (meaning making, non-hierarchical networks, complexity, and emergence) contrast with the classical themes March articulated (i.e., decision rationality, hierarchy, individual leadership, and historical efficiency). A combination of these alternative themes makes it possible for exploration and exploitation to be intertwined within and across levels. Such a view of organizing, which is consistent with calls from scholars to view organizations in dynamic processual ways (Cornelissen, 2005; Morgan, 2016; Tsoukas & Chia, 2002; Weick, 1979), is implicated in Jonathan Ive's (Apple's chief design officer) description of practices at Apple. He described how Apple's new products and prototypes on display in its Design Studio would serve as a visual narrative of "where the company [was] spending its energy and how things connect. . . in relationship to each other" and what "the future [of the company was] for the next three

years" (Isaacson, 2011, pp. 345–346). Bringing prototyping activities from design and meaning-making practices from narrative together, this visual narrative of products and prototypes made it possible for Apple's CEO, Steve Jobs, to "survey the tables and see the products in the pipeline, sense how they fit into Apple's strategy, and inspect with his fingertips the evolving design of each" (Isaacson, 2011, p. 345).

Implications

Our perspective on exploration and exploitation unfolding simultaneously holds several implications for practice. At the workplace level, practices are required to encourage ongoing innovation across all employees in the organization. For instance, rather than separating thinking from doing as was the case with scientific management practices (Kanigel, 1997), practices such as prototyping (Thomke, 2003) can facilitate reflection in and on action (Schön, 1983). In organizations with such practices, the responsibility for innovating need not rest with any dedicated project team following linear stage-gate models (Cooper, 2008) unfolding in segregated spaces and overseen by top management. Instead, innovation as process is an ongoing distributed endeavor arising through the "cumulative synthesis" of multiple investigative efforts unfolding across the organization (see Usher, 1954 for more on cumulative synthesis).

In this regard, Bucher and Langley (2016) described practices that unfold in investigative and reflective spaces. As noted, investigative spaces facilitate tinkering through prototyping, whereas reflective spaces allow for collective reflection in and on action, such as demo slams at Google where employees could demonstrate their prototypes to all within the company (Garud & Karunakaran, 2018). Bringing together insights from design and narratives, Seidel and O'Mahony (2014) found that teams that scrutinized and edited collective representations of innovation through stories, metaphors, and prototypes, and linked them to constraints were better able to coordinate design tasks than teams that did not.

At the executive suite level, some scholars have argued for the integration of innovation into a firm's strategic initiatives (Becker & Müller, 2013, p. 14). Others suggest that strategic deliberations would be well served by building upon tenets of the design approach that advocates the creation of powerful alternatives (Boland & Collopy, 2004; Liedtka, 2015; Rindova & Martins, 2021). For instance, as prototype development and investigation ensue, "the decision about which alternative to select becomes trivial" (Boland & Collopy, 2004, p. 4).

These practices underscore an additional facet of innovation at work worth investigating. Interweaving all three notions of time (Chronos, Kairos, and Aion) generates options value for knowledge assets, one where the "future" is not necessarily a resource to be discounted (Doganova, 2024) but a processual journey to be nurtured, allowing ideas to be developed for their multiple potentialities and to be utilized when the situation is ripe (Garud & Nayyar, 1994; Lord et al., 2015).[20] In this view, a "field of possibilities" (Barad, 2003) emerges through the "intra-actions" of actors. As the field shifts, so do the paths of the actors involved and the artifacts they work with (Garud, 2021).

Yet, for the most part, organizations have been theorized around Chronos-based time (see also Reinecke & Ansari, 2015 who make a similar argument). There have been fewer efforts to theorize organizing for innovation as multi-temporal distributed processes. An early exception is work by Czarniawska (2004), who noted that theorization around "dispersed calculations" along with "Kairotic time" is required to complement traditional views on organizations based on "centers of calculation" and chronological time. Additional insights on this topic can be found in the work by Otto et al. (2024) who noted that it is possible to detrain from Chronos and eventually reframe it. Likewise, work by Blagoev and Schreyögg (2025) on firms' ability to deal with temporal complexity through varying degrees of

temporal uncoupling and differentiation also provides a useful direction for future research.

For instance, a particularly revelatory incident showcasing how ongoing prototyping implicates all three notions of time is illustrated by what transpired during the introduction of the Apple's iPhone and its Tablet.[21] Upon seeking a prototype of a "multi touch display system" for Apple's Tablet, which Jobs then forwarded to another employee who called him back to demonstrate "rubber band inertial scrolling," Jobs, experiencing a serendipitous moment, decided to shelve the introduction of the Tablet and instead focus on the iPhone. Only after the iPhone had succeeded did Jobs "pull the Tablet off the shelf and applied all that they had learned with the iPhone and went back to work on a tablet."

On another front, research highlights the benefits of management establishing a supportive environment coupled with stretch goals (Gibson & Birkinshaw, 2004; Kauppila & Tempelaar, 2016). For instance, research at Google found that establishing psychological safety (Edmondson, 1999) is important for increasing team effectiveness (Rozovsky, 2015). Relatedly, Mukerjee and Metiu (2022, p. 4) found that "play" defined as activities that are "voluntary and not related to work tasks with the primary goal of fun and enjoyment" can create an environment where it is psychologically safe to innovate (see also Gadamer (2013) and Schrage (1999) for the importance of play). This is a point that Müller (2013, p. 146) also made in his call for an "anxiety-free, motivating and failure-friendly corporate culture, as well as enough time for the employees to take the wrong paths and detours, which every story of innovation entails." For instance, freeing up chronological time for investigation is a temporal structuring mechanism that can generate the intrinsic motivation for employees to be creative at work (Amabile & Kramer, 2011).

At the meso level, it is valuable to build a narrative infrastructure comprised of innovation stories that (a) celebrate distributed efforts to challenge the status quo, (b) highlight the complexities of the innovation process, and (c) share both successes and failures (Bartel & Garud, 2009; Müller, 2013). An accumulation of stories of employees investigating novel ideas that emerged during work helps legitimize deviations, preventing the organization and its employees from being confined by a dominant narrative that hinders innovation and transformation.[22] An example is 3M's repository of innovation narratives that detail how entrepreneurs "outsmarted managers," and why the "failures from informed entrepreneurial efforts are less risky than the failures that arise because of uninformed micro-management" (*3M Innovation chronicles, 1998*). Useem (2002) reported,

> At 3M, stories are a big deal. Every employee knows about the 3M scientist who spilled chemicals on her tennis shoe—and came up with Scotchguard. Everyone knows about the researcher who wanted a better way to mark the pages of his church hymnal—and invented the Post-it Note. . . Collectively these stories form a larger narrative about how 3M became, and remains, one of America's premier corporations.

Overall, and consistent with Gibson and Birkinshaw's (2004) observations on the need for a supportive organizational culture, a cultural shift is required to enable exploration during exploitation. Building on the notion of "culture making" (Gehman & Soublière, 2017, p. 61), we propose that culture making by intrapreneurs emphasizes "the distributed and intertemporal processes whereby value is created across multiple and fluid repertoires and registers of meaning."

Culture making was evident in Samsung's efforts to implement design practices including prototyping and experimentation to overcome the company's lack of innovation. Samsung's innovation-focused culture now consists of interactions between members of multidisciplinary teams of designers, engineers, marketers, ethnographers, musicians, and writers who are on the lookout for users' unmet needs and identify cultural, technological, and economic trends. However, this shift was not easy for Samsung, as reported by Yoo and Kim (2015,

p. 4): "Shifting to an innovation-focused culture without losing an engineering edge is not a simple matter. It involves managing a number of very real tensions. . .A risk-averse culture must learn to accommodate experimentation and occasional failure."

Future research on innovation at work in the age of digital technologies and Gen AI

Our theorization of exploration and exploitation being interwoven is particularly relevant for innovation at work in today's context constituted by digital technologies and generative AI (Gen AI). Theorizing the possibilities offer important avenues for future research, which we outline here. For instance, digital platforms make it possible for firms to engage in architectural and modular innovations (Henderson & Clark, 1990) where some modules of the platform and the connections between them can change while other modules remain the same. Such initiatives explore new functionalities by exploiting existing architectures (Cattani et al., 2024; Garud & Kumaraswamy, 1995; Karunakaran, 2022). How actors may explore new functionalities by exploiting existing architectures is a topic worth further investigation in the context of organizational ambidexterity.

Another avenue is knowledge creation and sharing in today's digital age. Digital repositories serve as living "bodies of knowledge" that are used not only to archive but to continuously create, curate, and categorize information in real time to be used over extended temporal horizons. This dynamic is not necessarily a path-dependent process (Sydow et al., 2009). Instead, as was argued by Simon (1996) in his example of ideas emerging during painting on a canvas, the interactions between humans with digital repositories of knowledge allows for serendipitous discoveries because of which individuals are likely to encounter novel ideas and solutions that were neither anticipated nor actively sought. When this transpires, the course of the paths being pursued may change in a path creative or enactive process (Feuls et al., 2024; Garud et al., 2010; Pentland et al., 2025), thereby challenging linear associations between knowledge exploration and exploitation.

For example, in a firm that we studied, a digital repository allows the simultaneous creation and utilization of knowledge by employees by enabling them to both contribute to and draw from the repository as they engage with it (Garud et al., 2006). Furthermore, the digital repository serves as a connective platform, allowing users to interact with subject matter experts within the organization, thereby fostering a relational knowledge network. As a result, the organization is better conceptualized as a "meshwork" of connections (Ingold, 2021), continually performing even as it transforms.

The concept of "search" has played a key role in the exploration and exploitation literature, with scholars distinguishing between "local" and "distant" searches. However, since exploration and exploitation can occur simultaneously, alternative concepts may be helpful. Terms like emergence, surprise, serendipity, exaptation, and temporal translations could complement traditional notions of search, describing better how actors can navigate the complex, non-linear processes of knowledge creation, repurposing, and reconfiguration.

These processes may resemble what Cohen and Levinthal (1990) refer to as "absorptive capacity," but now with an added emphasis on the fluid, iterative nature of knowledge transformation through reutilization. Garud and Nayyar (1994) labeled this as transformative capacity—that is, the capacity of organization to continually restructure by repurposing and reconfiguring knowledge resources, a task that entails both exploration and exploitation within and across levels. Even in non-digital worlds, 3M's and Corning's technological platforms, which allow for retention, reuse, and transformation of knowledge assets, serve as examples (see Andriani & Cattani, 2024; Garud et al., 2011).

The increasing prominence of Gen AI amplifies the importance of theorizing exploration and exploitation as being intertwined in practice. Gen AI as a part of employees'

everyday work can help not only automate mundane, repetitive tasks, but also augment other higher-order, complex tasks by freeing up attentional resources for idea generation and investigation (Hollister et al., 2023). Besides, the integration of Gen AI into work practices can facilitate rapid feedback loops between exploration and exploitation, with the "human-AI ensemble" (Choudhary et al., 2025) continually refining outputs based on user inputs and evolving data through an emergent and interactive process.

This interactive dynamic between human–AI ensembles highlights the need for approaches that view exploration and exploitation as unfolding simultaneously. While this has been a possibility even before the rise of digital technologies and Gen AI, it is even more crucial today. The challenge moving forward is to develop more nuanced approaches to organizing for innovation, recognizing the complex, interdependent relationship between exploration and exploitation given the pitfalls and possibilities offered by these new technologies.

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ORCID iDs

Raghu Garud https://orcid.org/0000-0002-3685-4011
Marja Turunen https://orcid.org/0000-0003-2681-7329
Arvind Karunakaran https://orcid.org/0000-0002-6755-5815

Notes

1. Foregrounding the utility of pursuing this question, Farjoun (2010) drew on the distinction between exploration and exploitation to examine the duality between change and continuity. While acknowledging Farjoun's contributions, we note that exploration and exploitation are depicted as being oppositional in his framework.
2. We chose the prefix "neo" to signify amendments to the classical view and the prefix "post" to indicate a more fundamental transformation.
3. Pickering chose to use the term "resistance" rather than "constraint," as the use of the latter term signals dualism and determinism.
4. Some have critiqued Simon's work as positivistic based on technical rationality (see You & Hands, 2019 for a summary), and have suggested extensions through work of other design scholars such as Schon (1995).
5. Using Emirbayer and Mische's (1998) framework, "practical evaluative" facets of work in conjunction with a "future orientation" can lead to reflection *in* and *on* "habitual practices."
6. See also Hernes and Schultz (2020) on how actors address distant past and future events through situated activity.
7. The code he wrote, "was never useful and never got off the ground" and the previous project "didn't go anywhere" (Buchheit, in Livingston, 2007).
8. There is now growing interest in serendipity (see for instance Busch, 2024 for a review), a concept that Merton and Barber (2011) investigated in their book titled *The Travels and Adventures of Serendipity*.
9. We decided to use the term "investigate" to include experimentation (Cook, 2015; Rahman et al., 2023) besides other practices such as piloting, prototyping (Geissdoerfer et al., 2022), and pretotyping (Savoia, 2011) that actors engage in to determine feasibility.
10. See also Lord et al. (2015) for how reflection on the paths not taken can serve as triggers for counterfactual thinking.
11. See also Hernes and Feuls (2024) on "turning points" shaping trajectories and processes of change.

12. We conceptualize the rigid adherence to chronologically entrained routines as temporal prisons.
13. In Simon's (1996) parable, two watchmakers, Tempus and Hora, when distracted from their tasks, would have to start from scratch because they could not rely on long-term memory to remember where they had left off in their projects. Simon's argument, focused at the individual level, is equally applicable to other levels of analysis, including routines. While he used the watchmaker parable to support his arguments on the evolutionary advantages of modularity and architecture, here we focus on the temporal disruption that occurs when a routine is interrupted. We argue that the presence of a surrogate generative memory, through narratives, can help overcome such disruptions by facilitating meaning-making.
14. Relevant here is Schultz and Hernes' (2013, p. 1) statement that "It is important to note that the past is not there 'in it-self' (Mead, 1932, p. 9) but is called forth in memory through its relationship to the emergent future." While we agree, we prefer not to evoke the terms 'past', 'present', and 'future' to talk about trans-temporal Aionic time.
15. Related ideas are "bricolage" (Baker & Nelson, 2005; Garud & Karnøe, 2003) based on Levi-Strauss's (1967) insights on making do with things at hand, and "exaptation" (Andriani & Cattani, 2016; Garud et al., 2016) based on Gould and Vrba's (1982) insights on repurposing of existing resources.
16. Novel ideas and their significance emerge through dialogue (Bakhtin, 1992; Tsoukas, 2009) involving a process of comparison and contrasts (Greimas, 1987). Real-time meaning making unfolds as actors make sense of ambiguous phenomena through narratives by asking, "What is this all about?" or "What paths do these events close and open?" Boje (2008) labels these as antenarratives to emphasize the speculative bets that actors make. Through antenarratives, a mutual understanding emerges between the actors, which in turn facilitates cooperation between them (Garud, Dunbar & Bartel, 2011; Riessman, 1993). As the process unfolds, the original idea itself is transformed as are the identities of the people involved.
17. One understanding of the 15% rule is that 85% of the time is set aside for exploitation and 15% for exploration. But, as was explained to us by 3M managers, the 15% time was always a latent resource that 3M employees could draw upon to recognize and investigate novel ideas that emerge during Kairotic moments at work (Garud, Gehman, & Kumaraswamy, 2011). Indeed, this temporal structuring of activities, which legitimizes deviations, allowed Silver and others to keep the idea alive and investigate its potential uses.
18. Relevant here is the distinction between boundary objects, epistemic objects, and activity objects (Nicolini et al., 2012). As Nicolini et al. (2012) explained, "boundary objects bridge different knowledge domains, thereby enabling cross-disciplinary collaboration; epistemic objects promote cooperation by fostering mutuality and solidarity, as they inspire desire, attachment, and interdependence; and activity objects drive collaboration and guide actions, uniting various types of knowledge, while simultaneously creating contradictions that spark innovation."
19. Podolny and Hansen's (2020) description of Apple's work practices are relevant here. At Apple, decision rights reside with those who have domain expertise. Consistent with the notion of a non-hierarchical network, these experts collaborate intensely with other experts from all over the company. Enabling such collaborative efforts are multiple leaders who (a) have deep knowledge, (b) are immersed in detail, and (c) can foster collaborative dialogues with one another.
20. See Blagoev et al. (2024) for distinctions between time as structure, time as process, and time as resource.
21. https://www.youtube.com/watch?v=jdbvAdINPPA
22. Relevant here is March's (2010) comments on themes and counter-themes. He noted, "Stories built on the main myths undoubtedly will more easily find credence than will stories built on the counter-themes, but part of the process of mythic development is found in the experiments with themes by storytellers." Based on prior research that we have reported, we propose that organizations can experiment with alternatives to the main dominant themes that structure organizations and work practices.

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Author biographies

Raghu Garud (rgarud@psu.edu) is Professor of Management and Organization and the Farrell Chair in Innovation and Entrepreneurship, Pennsylvania State University. Raghu takes a processual approach to examine the emergence and translation of novelty. In 2020, the Technology and Innovation Management Division of the Academy of Management recognized Raghu's work by naming him its Distinguished Scholar.

Arvind Karunakaran (arvindka@stanford.edu) is an assistant professor of management science & engineering at Stanford University. He is a member of the Center for Work, Technology, and Organization (WTO), the Stanford Technology Ventures Program (STVP), and a faculty affiliate of the Institute for Human-Centered Artificial Intelligence and the Digital Economy Lab. His research focuses on authority and accountability in the workplace during periods of technological change. His current research focuses on human-AI augmentation and its impacts. His research is published in Administrative Science Quarterly, Academy of Management Journal, Academy of Management Annals, Organization Science, Strategic Organization, and Research

Policy. He received his Ph.D. in Management from MIT Sloan School of Management.

Marja Turunen (marja.turunen@utu.fi) is a Senior Research Fellow in Management and Entrepreneurship at the University of Turku. Marja holds a PhD (DSc in Technology) in Industrial Engineering and Management from Aalto University. In her PhD, Marja explored a consciousness-based view of the firm. Her current postdoctoral research is around strategic consciousness-based digitalization. Her research on innovation, AI, and Blockchain has been published in journals such as Future Technology and Social Change, Innovation: Organization and Management, among others, and books such as The Oxford Handbook of Organization Change and Innovation, and The Encyclopaedia of Innovation.