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The Process Affordances of Strategy Toolmaking when Addressing Wicked Problems

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ABSTRACT Studies have examined how managers *use* strategy tools, but we know much less about how managers *create* strategy tools *de novo*. We undertook an ethnographic study of a business facing a wicked problem and investigated the sociomaterial practice of collective toolmaking. We identify how strategy toolmaking oscillates between different problem domains and reveal how this manifests process affordances, which are 'unintended' by-products of the toolmaking process. Counterintuitively, by intentionally making a strategic tool, actors unintentionally create a sociomaterial springboard for 'spin-off strategizing' and 'the discovery of latent ambiguities', generating strategic value beyond the tool produced. These insights illuminate how the practice of collective toolmaking can stimulate wayfinding, indirectly helping managers to respond to wicked problems, characterized by high degrees of complexity, ambiguity, and indeterminacy.

Keywords: affordances, strategy-as-practice, strategy process, strategy toolmaking, strategy tools, strategy tools-in-use, wayfinding

INTRODUCTION

Managers frequently operate in environments where they confront wicked problems (Rittel and Webber, 1973), involving unprecedented challenges, tangled issues, and multiple stakeholders with divergent priorities (Camillus, 2008; Conklin, 2006). Studies of wicked problems at the macro level have emphasized the importance of field-frames (Reinecke and Ansari, 2016), distributed problem solving (Ferraro et al., 2015), and systemic tensions (Schad and Bansal, 2018). Yet, we know surprisingly little about the sociomaterial practices managers use to address and strategize wicked problems (Vaara

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and Whittington, 2012). A key challenge managers face is that generic strategic tools provide few answers to wicked problems. As Denis et al. (2007, p. 182) concluded, 'models of strategic management are of limited assistance in understanding or confronting complex challenges in pluralistic contexts'. Indeed, Camillus (2008) suggests that using conventional strategy tools may exacerbate wicked problems by encouraging managers to produce ill-suited solutions.

Consequently, researchers often suggest that managers must address wicked problems inductively to formulate issues (Rittel and Webber, 1973), surface latent tensions (Schad and Bansal, 2018), and mitigate fragmenting forces (Conklin, 2006). While managers cannot solve wicked problems, they 'can learn to cope with them' (Camillus, 2008, p. 102). This accords with the notion of wayfinding, where strategy-making unfolds from practical coping activity (Chia and Holt, 2006). Here, strategy-making is less about navigating with pre-existing tools and more about stepping 'into the unknown and developing an incomplete but practically sufficient comprehension of the situation in order to cope effectively with it' (Chia and Holt, 2009, p. 159).

In this paper, we investigate how making a custom-built strategy tool *de novo* can help managers to explore, strategize, and cope with wicked problems. While literature often discounts strategy tools when discussing wicked problems, the process of *making* a strategy tool invites an inductive approach that may create distinct process affordances – i.e., unfolding action possibilities (Gibson, 1977) – relative to *using* generic strategy tools. Strategy tools are 'knowledge artifacts' (Jarzabkowski and Wilson, 2006, p. 355) that embody rational conceptions of strategy-making (Cabantous et al., 2010; March, 2006). Using such tools suppresses wayfinding by encouraging managers to see strategy-making as a process of map-based navigation – i.e., 'knowing before we go' (Chia and Holt, 2009, p. 164); a perilous presupposition when dealing with wicked problems that cannot be known *a priori* (Camillus, 2008, 2016; Rittel and Webber, 1973). Even if managers adapt strategy tools (Jarzabkowski and Kaplan, 2015), the artifacts may subdue wayfinding by steering them towards established theoretical courses and restricting discussions. As Jarzabkowski and Kaplan (2015, p. 539) explain, strategy tools 'make an argument about what is important to analyse strategically and, conversely, what is not'.

We investigate how making a strategy tool *de novo*, in contrast to using a strategy tool, may unshackle managers from these restrictions and provide an open-ended means to traverse the labyrinthine complexity of wicked problems. In particular, we ask: *How do the process affordances of strategy toolmaking help managers deal with wicked problems?* To answer this question, we draw on an ethnographic study of toolmaking in a construction-engineering firm, where senior managers developed a custom-built strategy tool to address a wicked problem arising from growing numbers of public-private partnerships with schools and hospitals. In our fieldwork, we were struck by how managers' efforts to create this strategic tool inadvertently produced a stream of strategically significant insights, discoveries, and decisions that were unintended by-products of the toolmaking process.

Our findings reveal how strategy toolmaking creates a sociomaterial springboard that affords strategizing detours and improvisational strategizing, inviting managers to explore an indeterminate wicked problem. We identify two key process affordances that help managers accomplish strategy work when confronting wicked problems: (1) recurrent 'cycles of spin-off strategizing', which allow actors to delve into the unarticulated

dimensions of a wicked problem; and (2) an unfolding 'discovery of latent ambiguities', which are partially translated into the strategic tool. These insights extend the literature on strategy 'tools-in-use' (Jarzabkowski and Kaplan, 2015) and reveal how the creation of strategy tools *de novo* precipitates wayfinding (Chia and Holt, 2009; Comi and Whyte, 2018), drawing attention to the efficacy of spontaneous, in-the-moment, non-linear affordances when tackling wicked problems.

THEORETICAL BACKGROUND

Wicked Problems and Wayfinding: The Limitations of the Tools-in-use Perspective

A key debate in the literature has revolved around the efficacy of strategy tools – e.g., models, frameworks, and techniques – when confronting complex, uncertain, and ambiguous strategy challenges (Jarzabkowski and Kaplan, 2015; March, 2006). Strategy tools are 'actionable forms of knowledge that strategy research *provides to practice*' (Jarzabkowski and Wilson, 2006, p. 356, *emphasis added*). These tools are often designed by academics and consultants to help managers navigate problems using theoretical formulations (Moisander and Stenfors, 2009; Vuorinen et al., 2018). However, March (2006) and others have argued that these rational formulations are often inadequate, and sometimes dangerous, when dealing with complex, pluralistic, and wicked problems (Bettis, 2017; Camillus, 2008; Denis et al., 2007). Research studying strategy tools-in-use offers two counterpoints (Jarzabkowski and Kaplan, 2015).

First, studies show that strategy tool use is not limited to the application of rational theoretical prescriptions (Jarzabkowski and Kaplan, 2015). Rather, 'in practice' tools provide multiple affordances or action possibilities (Gibson, 1977) that managers exploit for multiple ends, for instance, to create legitimacy, instigate conversations, gain influence etc. (Jarzabkowski and Kaplan, 2015; Jarzabkowski and Wilson, 2006). Thus, strategy tools are valuable props that can support strategy work, even if the value of such tools is reduced by incongruities between the content of a tool and a wicked problem.

Second, research has shown that managers often modify and contextualize strategy tools in practice (Jarratt and Stiles, 2010; Jarzabkowski and Kaplan, 2015). For example, Chelsey and Wenger (1999) described how managers fine-tuned a Balanced Scorecard – e.g., changing labels, moving arrows – during strategic planning. Likewise, Demir (2015) revealed how managers and IT developers in a bank reconfigured a customer analysis tool to implement a strategy. Thus, adapting strategy tools is a common practice (Jarzabkowski and Wilson, 2006) that managers could, in theory, employ when facing wicked problems.

However, this approach has significant drawbacks when dealing with wicked problems, where there is 'no precedent' or 'known formula' to guide managers through the thicket of tangled issues, competing values, and intractable dilemmas (Camillus, 2008). Wicked problems are unknown quantities that 'defy efforts to delineate their boundaries' (Rittel and Webber, 1973, p. 167). There are numerous latent tensions and fragmenting pressures (Conklin, 2006) that are harmful if not apprehended (Schad and Bansal, 2018).

Using or adapting standard strategy tools may do more harm than good if the rationality instantiated in tools (Cabantous et al., 2010) leads managers to oversimplify wicked problems and gloss over latent issues (see Camillus, 2008; March, 2006). Moreover, generic strategy tools will tend to steer managers towards pre-existing constructs, propositions, and decision rules (Moisander and Stenfors, 2009; Wright et al., 2013), which will restrict wayfinding (Chia and Holt, 2009). As Jarzabkowski and Kaplan (2015, p. 545) note, managers may improvise with strategy tools but the 'scope of these improvisations is not infinite' because their affordances 'bracket what may and may not be discussed'. This bracketing will reduce users' freedom and inclinations to go 'off course' and explore the uncharted territories of a wicked problem. Even if managers turn to less structured tools like scenario planning (Courtney et al., 1997) or causal mapping (Paroutis et al., 2015) there are methodological steps to be followed, often led by an external facilitator who will steer conversations in a controlled and deliberate way.

We explore an alternative means by which managers may approach wicked problems: making strategy tools *de novo*. While there have been calls to extend the tools-in-use perspective by exploring the *de novo* development of strategy tools (Glaser, 2017; Jarzabkowski and Kaplan, 2015), we know surprisingly little about the process of making and reconfiguring tools from a tabula rasa (Mikes and Zhivitskaya, 2017), or the benefits this process reaps. We suggest that the toolmaking processes may offer a creative way to engage wicked problems. By immersing themselves in a wicked problem, managers may generate opportunities to explore indeterminate boundaries (Rittel and Webber, 1973), build shared understandings (Camillus, 2008; Conklin, 2006), surface underlying tensions (Schad and Bansal, 2018) and allow practical solutions to emerge in situ as they grapple with predicaments (Bouty et al., 2019; Chia and Holt, 2009). Collective toolmaking, we argue, may unshackle managers from the rigidity of pre-existing tools and generate process affordances that support immersive wayfinding (Chia and Holt, 2009).

The Process Affordances of Making Strategy Tools *de novo*

We define strategy toolmaking as a collective endeavour, where managers start with a tabula rasa and work to conceive, design and build a strategy tool – e.g., model or framework – that embodies theoretical prescriptions and actionable knowledge for future users (Jarzabkowski and Wilson, 2006). Thus, toolmaking is a purposeful activity (Glaser, 2017) involving a dynamic sociomaterial interaction between people, an epistemic object – e.g., an articulated problem – and a partial object – e.g., a tool being constructed with materials (Knorr Cetina, 2001; Werle and Seidl, 2015). Research has shown that designing and making artifacts – e.g., PowerPoints, 3D models, technologies – is a generative process: ideas are separated from individual minds (Stigliani and Ravasi, 2012), instantiated in materials and rendered available for reflective discussion (Glaser, 2017; Heracleous and Jacobs, 2008; Knight et al., 2018; Werle and Seidl, 2015). Thus, making things can stimulate sensemaking (Stigliani and Ravasi, 2012), creativity (Heracleous and Jacobs, 2008), and focused exploration (Werle and Seidl, 2015).

While developing a strategy tool may involve similar design practices to those reported in other material making studies (e.g., Knight et al., 2018; Werle and Seidl, 2015), the affordances manifested may be different when engaging wicked problems. Wicked

problems have no 'right answer' or 'stopping rule' (Rittel and Webber, 1973). Thus, the process will be exceptionally open-ended as actors venture through ambiguous issues in search of workable formulations (Conklin, 2006). As actors work towards rational solutions, focusing on an articulated 'piece' of a wicked problem (Churchman, 1967), the epistemic object will 'lack completeness' with 'the capacity to unfold indefinitely' (Knorr Cetina, 2001. p. 181). Thus, purposeful action and unfolding discovery may propel toolmakers in unanticipated directions as they venture through tangled problems (Camillus, 2008; Schad and Bansal, 2018) and unravel knotty issues without forethought (Chia and Holt, 2009). Hence, we explore how strategy toolmaking may generate process affordances that precipitate this kind of purposive activity – i.e., patterns of action that are 'conscious but non-deliberate' – yet, strategically valuable (Bouty et al., 2019, p. 2).

We define process affordances as unfolding action possibilities rendered available when managers interact in a sociomaterial setting. When researchers study affordances they typically focus on the affordances of things – i.e., 'how the materiality of an object favours, shapes, or invites, and at the same time constrains, a set of specific uses' (Zammuto et al., 2007, p. 753). We see this in studies of product design (Norman, 1999), technology (Hutchby, 2001), and accounts of how tools solicit knowledge production (Paroutis et al., 2015) and strategic behaviour (Demir, 2015).

Our conceptualisation of process affordances differs in two ways. First, we draw attention to the affordances of unfolding sociomaterial interactions. This conception is rooted in a process ontology where process has primacy and 'things are simply constellations of processes' (Rescher, 1996). Accordingly, the world is continually 'becoming' (Tsoukas and Chia, 2002) as people and materials interact. Gibson (1977, 1979) developed affordance theory to explain how environments – e.g., habitats, landscapes, objects, people – offer living creatures particular action possibilities. While Gibson did not focus on process per se, his work has processual overtones and articulates how 'behaviour affords behavior' (1977, p. 76). The relational ontology at the heart of affordance theory cuts across the subjective-objective dichotomy (Gibson, 1979; Orlikowski and Scott, 2008) by conceptualising the environment and the actor as mutually agential. Thus, affordances are 'equally a fact of the environment and a fact of behavior' (Gibson, 1979, p. 129) and action possibilities emerge from dynamic agent-material solicitations (Demir, 2015; Withagen et al., 2012). The notion of process affordances spotlights how these agent-material solicitations are continually becoming (Tsoukas and Chia, 2002). As Heft (2003, p. 151) explains, when people and materials interact, innumerable action possibilities are 'manifested in the flow of ongoing perceiving and acting'. The action possibilities detected or 'picked-up' depend on the needs, motives, desires or abilities of actors in-the-moment (Costall, 1995).

Second, our conception of process affordances directs attention to the *unanticipated* affordances of sociomaterial interactions (Comi and Whyte, 2018; Fayard and Weeks, 2007). Thus, we broaden the lens beyond single objects to explore how assemblages of people, materials, and epistemic objects (Knorr Cetina, 2001) create a rich ecology of action possibilities (Rietveld and Kiverstein, 2014). As Gibson remarked, we experience the 'environment' in terms of its affordances, not just single objects, and 'the richest and most elaborate affordances of the environment are provided by other people' (1979, p. 135). This creates a theoretical bridge with wayfinding (Ingold, 2000) that can help to

explain how non-deliberate action, or purposive activity (Chia and Holt, 2009), unfolds as managers 'immersed in situated doing and being' (Heft, 2003, p. 151) intuitively respond to the affordances available in-the-moment (Withagen et al., 2012). While a few studies have noted how making objects can lead strategy-making in unexpected directions (Knight et al., 2018) and precipitate moments of innovation (Boland et al., 2007), the study of unanticipated 'process affordances' and 'non-deliberate action' has been largely overlooked. As Comi and Whyte (2018, p. 1060) note, when scholars study material making, they typically focus on purposeful action but miss 'the spontaneous actions of practitioners dwelling into visual artefacts'. In this paper, we explore how these unanticipated and non-deliberate actions unfold and help managers accomplish strategy work when dealing with wicked problems.

METHODS

Research Context

We took advantage of an opportunity to study the practice of collective toolmaking in response to a wicked problem (Eisenhardt, 1989). We focus on the toolmaking work of senior managers in ZCorp, a multidivisional construction-engineering group that had entered the public-private partnership (PPP) market at the turn of the millennium to exploit opportunities created by the Government's Private Finance Initiative (PFI) and Building Schools for the Future (BSF) schemes (HM Treasury, 2008). This context was ideal for studying how toolmaking can help managers to address wicked problems that involve multiple stakeholders, contested values and priorities, and tangled problems that cannot be solved (Camillus, 2008). ZCorp had won several PPP contracts and were soon running multiple cross-sector partnerships with different hospitals and Local Education Authorities (LEAs). This success brought unprecedented challenges. Each partnership involved complex contractual negotiations, complicated financial agreements, the design and construction of multiple schools, or large hospitals, and the provision of bundled services previously provided by the public sector. These partnerships involved extensive cross-sector interactions, with divergent demands from multiple stakeholders in hospitals, local authorities, schools and communities.

Research suggests that ambiguity is endemic in long-term infrastructure projects where managers face 'messy and wicked problems that often have no identifiable clear solution' (Walker et al., 2017, p. 181). These challenges are amplified in PPP contexts because of cross-cultural tensions (Noble and Jones, 2006), with many in the public sector sceptical about private sector motives. Indeed, ZCorp managers bemoaned how some public sector partners were opposed to the schemes, seeing them as programmes of privatisation. This made partnering difficult. Interviewees talked about 'anti-business mind-sets', 'cultural tensions,' and 'conflicting priorities' hampering collaboration. As ZCorp won more projects, complexity and pluralism kept increasing, with more diverse stakeholders, diffuse power relationships and conflicting interests (Denis et al., 2007). Consequently, ZCorp's partnering portfolio was characterized by inconsistent relationships: 'We have everything from partnerships that are going well to extremely disappointing' (ZCorp

manager), with some described as 'trench warfare'. With new PPPs on the horizon, and a growing emphasis on 'partnership' in the market, these problems were a major strategic concern, but there was no solution. This paper focuses on how managers responded to this wicked problem by developing their own strategy tool – the ZCorp partnering model.

Data Collection

To study the unfolding practices and interactions of the toolmaking process, we relied on ethnographic observation (Adler and Adler, 1994), exploratory interviews (Spradley, 1979) and documentary data. Specifically, the paper draws from an ethnographic research project that stretched over a 3½-year period. We spent approximately 37 days at the organization, observing managers interact in offices and at local sites. This included observing formal meetings (27) in central and partnership offices, and attending cross-sector meetings, workshops and events. These observations provided an opportunity to watch formal and informal interactions unfold in real-time (Lofland, 1971). Most internal meetings were audio-recorded and over 75 pages of fieldnotes were generated, capturing contextual details, partnering challenges, summaries of conversations, and personal impressions. Many observations occurred before the strategy tool was developed in what we label the pre-work phase (see Table II). These observations reinforced our understanding of the partnering context and the challenges faced by ZCorp.

Ten months into the study, an opportunity arose to observe the strategy toolmaking process, the focus of this paper. This toolmaking took place over an 11-month period, but centres on four key meetings that took place between January and March, where eight Directors and senior managers worked together to develop a partnering model; we label the four meetings M1, M2, M3 and M4 (Table II). We were given permission to observe and audio-record these four meetings, which were subsequently transcribed verbatim. These observations enabled us to capture the dynamic sociomaterial interactions that unfolded as managers performed toolmaking in a natural setting (Adler and Adler, 1994).

We also conducted 66 exploratory interviews (Spradley, 1979), 28 of which were in the pre-work phase. We interviewed all managers involved in developing the partnering model (see Table I), and many other senior and operational managers in ZCorp. The average length of interview was 1hr 18mins and all interviews were recorded and

Table I. Directors and senior managers involved in the collective toolmaking

Rob	Executive-Director-Business Development
Paul	Director-Business-Development-Healthcare
James	Executive-Director-Operations
Linda	Director Operations-Education
Ken	Director-Operations-Healthcare
Mary	Director-Marketing-and PPP-Engagement
Jane	Senior-Manager-Marketing-Operations
Pam	Senior-Manager-Community-Engagement

Table II. Timeline for main collective toolmaking activities

Month	*Activities/actors*	*Key inputs*	*Key outputs*
Pre-work April-Dec.	• Initial attempt to develop a ZCorp-wide partnering model based on AlphaPPP • Driven by Rob with the support of direct report (Mary)	• Practical experience and experimentation. Some borrowing of tool elements - Government toolkits, KPIs, drawing inspiration from the notion of a balanced scorecard etc.	• Production of a PowerPoint deck (8 pages) outlining a proposed partnering model (V1). Supplemented with notes, partnering scorecard, annual partnership report
Meeting 1 Early Jan. 2hr 17min	• Rob instigates meeting to discuss and redevelop the partnering model • Rob, Jane, Linda, James and Pam attend (Ken unavailable)	• PowerPoint model examined and discussed in detail. Rob takes notes and makes a few small amendments during the meeting	• Initial draft (V1) extended from 8 to 13 pages and distributed (V2). Rob works on the model, which he brings to M2 (V3)
Meeting 2 Early-Feb. 2hr 06min	• Rob arranges a second partnering model meeting, building on M1 • Rob, Jane, Linda, James and Ken attend	• Print out of a fifteen-page PowerPoint model for education discussed and examined in detail. Rob takes notes, scribbling on his hard copy (V3)	• Rob works on the model – it is extended to 17 pages (V4). Jane works on new proposal for healthcare partnering model in a Word document (H1)
Meeting 3 Late-Feb. 1hr 32min	• Jane instigates a healthcare partnering model meeting • Jane and Ken attend	• Draft PowerPoint model for healthcare discussed. Jane takes extensive notes	• Jane produces healthcare version of the partnership model, partly aligned with education (H1)
Meeting 4 Early-March 1hr 57min	• Rob calls final model meeting • Rob, Jane, Linda, Ken, Paul, Pam attend (James unavailable)	• Final 17-page PowerPoint model for education introduced and discussed. Jane talks through proposal for healthcare model	• Education model signed off (V4). Jane to make further amendments to healthcare model (H2). Plans made for the roll-out of the models

transcribed verbatim. Example questions included: 'What is an effective PPP partnership? How do you build an effective partnership? What are the principle barriers?'. These interviews provided valuable contextual background about the wicked problem, allowing us to probe divergent perspectives. Interviews revealed, for example, that ZCorp managers held divergent beliefs about the causes of problems, their significance and what should be done, enabling us to explore how these perceptual differences played out during the toolmaking process.

Finally, we collected company documents – e.g., partnering reports, tender documents, presentations, in-house magazines etc. – which provided insights into the context and material composition of the partnering model. Of particular importance were four versions of the partnering model, produced in PowerPoint with supplementary notes. These enabled us to trace the iterative development of the tool through the meetings.

Analytical Approach

We used an inductive theory-building approach, relying on ethnographic notes and open coding to develop concepts, themes, and aggregate dimensions (Strauss and Corbin, 1990). Fieldwork revealed that ZCorp was facing significant partnership difficulties to which managers had no answer. This led us to conclude that ZCorp was facing a wicked problem (Camillus, 2008) and that the strategy toolmaking process was a deliberate attempt to alleviate this problem. We focused our analysis on the toolmaking meetings to study how managers constructed the strategy tool and the value this process generated.

Our coding structure (Figure 1) was derived from a microscopic analysis of the meetings, using NVIVO to slice the data and Excel to interrogate unfolding exchanges temporally. In early phases of analysis both authors analysed transcripts and field notes independently. We produced a chronological storyline (Langley, 1999), noting insights that caught our attention. One author, who had not been in the field, provided a valuable 'outsider' perspective, challenging assumptions and adding rigour to the analysis (Evered and Louis, 1981). As we immersed ourselves in the data, we were struck by the level and breadth of strategizing. While 'material making' – e.g., producing the material tool – was clearly evident, more time was spent discussing, debating, and strategizing about 'how to improve the partnering processes'. Additionally, tangential problems and solutions were discussed at length. These appeared salient to the wicked problem of coping with a pluralistic environment, but they had little to do with the strategy tool or the articulated aim of the toolmaking. These empirical insights led us to conceptualize toolmaking as moving fluidly between 'three domains of toolmaking activity' (Figure 1): an 'articulated problem domain', a 'material making domain' and an 'unarticulated wicked problem domain'.

We scrutinized activities within these domains, going through meetings line-by-line, isolating exchanges and instances of strategizing, and assigning 1st-order concepts – e.g., 'discussions branch-off in unanticipated directions'. We were intrigued by how impromptu strategizing was continuously reoccurring. At this point, we began to iterate between data and theory (Locke, 2001), adopting an abductive mode of theorizing to interpret findings (Mantere and Ketokivi, 2013). Affordance theory (Gibson, 1977) sensitized us to how unfolding sociomaterial interactions were inadvertently inducing

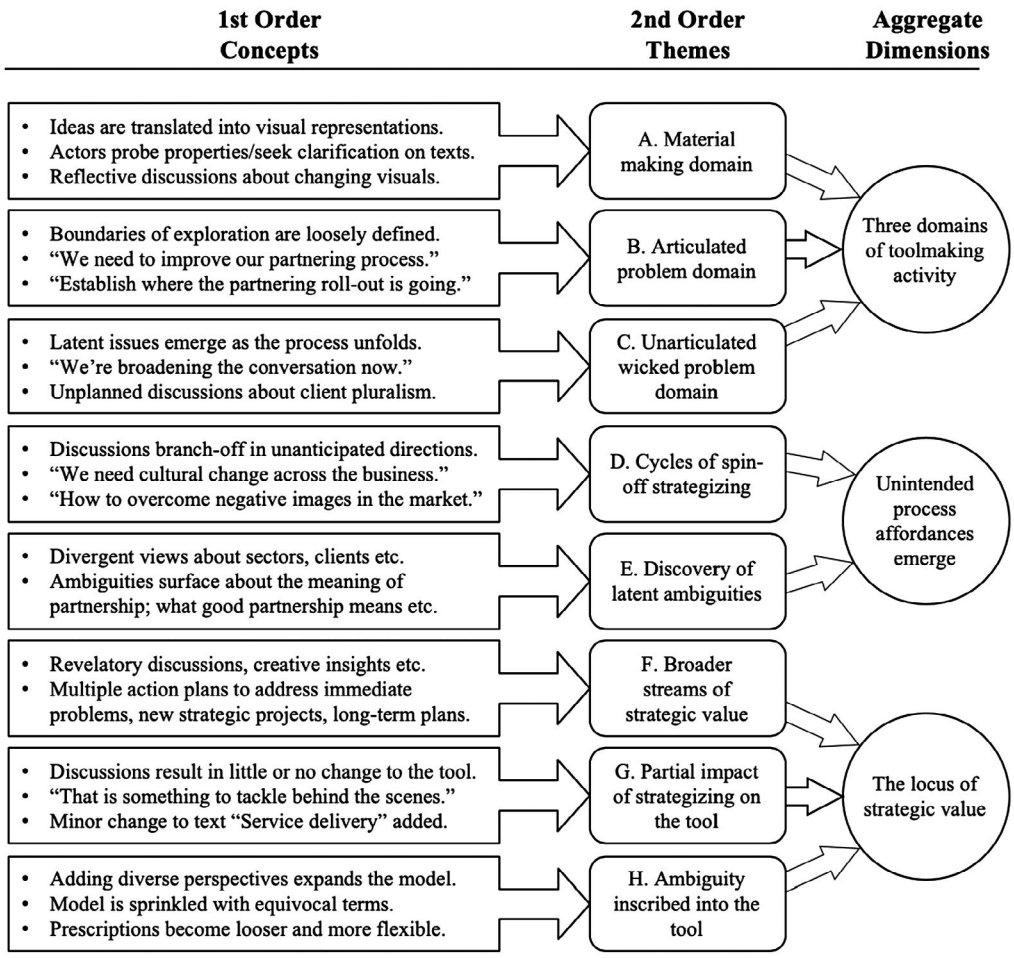

Figure 1. Coding structure

'in-the-moment' strategizing affordances as actors responded to materials and each other (Heft, 2003). We became attentive to how the affordances of the setting, and how actor's immediate experiences were stimulating unintended strategic behaviours that were accreting value. Our aggregate dimension 'unintended process affordances' (Figure 1) conveys how strategic value was often generated without intention. For example, our 2nd-order theme 'cycles of spin-off strategizing' (Figure 1D) captures how conversations would spontaneously 'spin-off' in unexpected directions, leading the group to suddenly strategize about, for instance, cultural change or how to deal with negative images. The 2nd-order theme 'discovery of latent ambiguities' (Figure 1E), by contrast, captures how interactions regularly surfaced latent ambiguities (see Table IV). We examined the relationship between these unintended process affordances and the 'locus of strategic value'. Importantly, we found that the strategic value was distributed across all problem domains and often only 'partially impacted the strategy tool'. This led us to theorize how the strategic value of toolmaking lay in the 'broader streams of strategic value' generated.

UNPACKING THE STRATEGY TOOLMAKING PROCESS

Initiating the Strategy Toolmaking Work

We start by outlining the precipitating context that triggered the strategy toolmaking. ZCorp had entered a new pluralistic environment with multiple public-private partnerships (PPP) creating unprecedented challenges. These PPPs required the cooperation of diverse stakeholder groups – e.g., hospitals, LEAs, schools, subcontractors – who had different values, priorities, and views about what genuine partnership meant: 'to some it's a bandwagon, to some it's a contract, to some it's a means of delivering' (CEO). Unsurprisingly, the quality of relationships varied and disputes were common: 'It doesn't matter what we do, they're not interested in a partnership with us' (Manager). These problems were compounded when ZCorp failed to qualify for two Building Schools for the Future bids, leading some managers to conclude, 'we have an image problem'. Managers impacted by these problems felt ZCorp needed to do more to overcome cultural barriers and build better partnerships: 'we're too contractual, too commercial, too hard-nosed'.

Rob, ZCorp's Executive Director of Business Development, believed ZCorp needed to invest more intellectual effort in formulating its partnering approach. Working with his direct reports, Rob took the first steps towards developing a partnering model. They targeted an educational PPP (Alpha) where the LEA was considered 'receptive to partnership' and experimented with new partnering structures and practices. For instance, they introduced facilitated workshops and established an inclusive partnership board, increasing the representation of schools and communities. They developed a partnering charter, partnership report and partnership scorecard that combined joint priorities: financial outcomes, pupil attainment goals, community regeneration priorities. Rob drew on these activities to develop a rudimentary partnering model, which documented the Alpha methodology in a PowerPoint, with supporting materials – e.g., partnership scorecard, survey and templates. At this stage, the model only consisted of 8 PowerPoint slides, with process figures, diagrams, and text prescribing key principles and activities at each phase.

Rob said he wanted to 'roll-out this partnership model with every school and hospital'. The model was shared on the ZCorp library – an online system – and Rob advocated its use in meetings. However, the roll-out stuttered with sporadic adoption and varying degrees of enthusiasm. Influential managers in operations were sceptical about the efficacy of the model. Mike, a partnership manager, felt, 'there are too many differences across the partnerships to adopt a "one size fits all" model'. Emma, a hospital project manager said, 'it wouldn't work here'. Linda, Director of Operations, was also critical: 'there's too much emphasis on workshops and "fluff" and not enough focus on delivering services and getting the business right'. While Rob's rudimentary partnering model was resisted, it played a key role in pulling influential managers together when Rob convened a meeting 'to achieve some consistency in understanding what our partnering model is' (Rob, M1).

The Cyclical Tool Production Process

Senior managers from business development, operations, and marketing came together in January to redevelop the ZCorp partnering model. As Table II shows, the collective toolmaking process stretched over four meetings, taking 3½ months to complete. The

articulated aim was to produce a credible partnering tool that ZCorp managers could use to improve partnering relationships with public sector partners. As Rob stated:

> 'This is one of the most important things we need to sort out. And actually, any thought that's gone into this up to now has been mine because nobody's actually engaged with it … it needs taking apart, rethinking, overhauling'. (M1)

This overhauling centred on remaking the material model (Figure 1A). During meetings, Rob navigated through the PowerPoint slides from his laptop and managers produced notes and sketches in situ as they wrestled with ideas and problems. This material making activity evolved through a cyclical process of *showing* material representations, *critical reviewing* texts, *generating new ideas* and *translating* those ideas into new material instantiations. In a typical iteration, Rob talked through an element of the model: showing it, describing it, explaining what it was supposed to achieve. This rendered his ideas visible and provided managers with the opportunity to scrutinize the representation: seeking clarifications, asking what things meant, proposing additions, suggesting improvements etc. This cyclical process was exemplified in meeting two (M2) when Rob showed the group a reworked partnering flow diagram. Jane kick-started the review: 'We need to squish those bits together'. This prompted debate about what was critical in the figure, while Linda sketched an alternative representation, which she handed to Rob to rework the figure.

This making process spurred exploratory discussions of the articulated problem, but managers then returned to the question: What, if anything, should be changed in the model? They typically arrived at a consensus ('I'll try and build that in', 'I'll adjust the language'), although agreed changes were often general and imprecise. It was between meetings that Rob and Jane – who later assumed responsibility for a healthcare variant – translated ideas, sketches, and notes into new versions of the model ('material translating'). New material instantiations then went through the same cycle of material showing, critical reviewing, idea generating, and material translating, until managers settled on a final material representation. Figure 2 provides a visual illustration of this material making cycle.

In Rob's initial model, there was no mention of service. However, the relationship between partnering and contractual services was a bone of contention for James and Linda (see Table III). Both saw service and partnership as entwined, and through discussion consensus grew that service should be represented. Rob translated this into an illustration (Figure 2i) where he tried to highlight the distinction between 'clients as partners' and 'service to users'. When this visualization was shown in M2 it prompted a debate about the meaning of partnership, particularly in relation to stakeholder expectations, output specifications and performance. New ideas emerged about 'over delivery' in critical areas and Rob translated these into a much more complex representation (Figure 2ii). However, when he showed it to managers they were perplexed and Rob, with some laughter, conceded it was 'hopelessly unclear'. The managers reviewed the figure again and distilled the essential points they wanted to show, which Rob translated into a simpler representation (Figure 2iii), capturing the main idea of aligning service delivery with stakeholder expectations and targeting stakeholder's unmet needs.

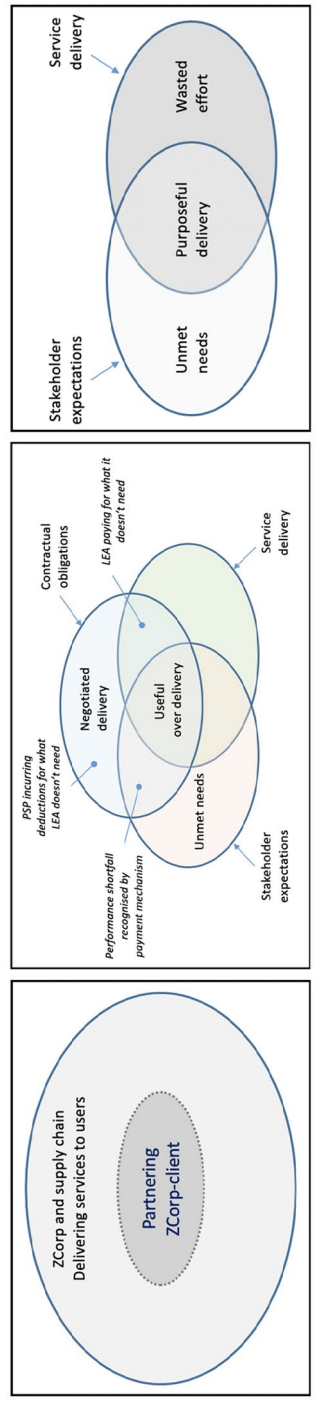

Figure 2. Ongoing material development: Incorporating service performance ideas

Table III. Strategizing affordances and the locus of value

Strategizing affordances (representative themes)	*Locus of strategic value*
• Issues with partnership systems. Incidences in M1, M2, M4 (illustration from M2). Linda says partner companies, who deliver critical services, are not providing key information, closing issues quickly enough or working collaboratively: 'you can't remove one from another'. 'We need them to start giving us the right information, closing out variations and reporting properly […] there's got to be a parallel universe here of getting systems and processes right, getting the business right. I keep saying this… versus the whole 'attitude of' approach, which are inter-meshed'. Ken: 'I agree, we're not even right in the basics at the minute'. Linda: 'we haven't got the structures in place to deliver a basic service, never mind to incentivize good customer service […] to effect good partnering we need more integration of both systems and processes and the attitudes and approach'	• Link to tool. No observed change in any versions • Broader strategic value. Linda and Ken share details about system issues others were unaware of, providing more clarity and understanding. There is questioning and learning. Jane asks: 'the question I have with healthcare is at what point does this happen?' Ken explains: 'immediately after financial close or near the end of preferred bidder.' Discussions reveal inconsistencies, which Linda and Ken agree to work on 'to get more continuity'. There is broad agreement that, 'we need integration of systems and processes and the approach.' In M3 Jane and Linda discuss the need to develop better partnering plans with partner companies: 'It is no use us doing an action plan, if we're not action planning with construction and facilities.' Rob agrees to pick this up when he meets with the sister companies
• Service performance issues. Incidences in M1, M2, M4 (illustration from M1). Jane shares operations research: 'I just got the data. It shows we're not delivering the service they're expecting and we're horrible to negotiate with […] it overlaps with other research, we're falling down'. This prompts discussion about what underlies these issues. They talk about values and behaviours. Linda recounts examples of where the behaviour and attitude of people has damaged service and client relationships. They also talk about not always delivering on promises: 'we haven't followed through on bid promises'. They talk about weak leadership: 'we have failed to adequately intervene'	• Link to tool. Minimal. Words 'Service delivery' and 'Purposeful delivery' added • Broader strategic value. Jane shares knowledge that builds a shared understanding about several issues: 'We focus on partnership at high levels, but it's often the lower levels, like the site managers, where the message hasn't got through'. They talk about introducing service training in areas like, 'How do to deal with issues when what the contract says is different?' They explore the possibility of using an external trainer to run training and talk about what could be done to 'instil behaviour traits needed to make the model work'. They later agree, 'we need to do a better job of developing leaders' and to make sure we 'transfer knowledge between phases'

Table III. *Continued*

Strategizing affordances (representative themes)	*Locus of strategic value*
• Friction and disunity between functions. Incidences in M1, M2, M4 (illustration from M2). Rob, Jane and Linda are engaged in a conversation about operations engaging with clients earlier in the model. Linda and Jane point to the current lack of communication between new business units and operations. Linda: 'nobody talks to you, let's be honest… the bid team go off and do it and then operations are there. That iteration thinking is not there'. James agrees: 'pre-financial close, the teams are focused on closing deals with minimal concern for the long-term planning of the partnership'. Linda adds, 'new business and operations are not talking to each other, we should be talking and learning'. This prompts a lot of discussion and the managers exchange ideas about how this might be improved	• Link to tool. No change. 'Something we must tackle behind the scenes' • Broader strategic value. These issues were not appreciated by Rob (and Paul) in M4. The toolmaking process gives Linda a platform to voice frustrations and to build awareness of the issues and their impact. They strategize about how to better integrate the teams to enable 'passing on of information gleaned during bidding' and 'sharing details about promises made'. This was categorized as a priority issue when it became apparent there is a 'yawning gulf' between the teams. Ken and Linda agree to instigate more meetings and Rob agrees to 'nudge his teams.' This conversation later spurs discussion about 'internal cultural issues' and the need to define 'our values' [a major initiative followed approx. one month later]

This cyclical tool production process was the material engine of the toolmaking activity. Managers were fully engaged in meeting their objective of purposefully constructing a strategic tool to tackle an articulated problem. In the following sections, we unpack how these purposeful sociomaterial interactions manifested unintended process affordances, which inadvertently helped managers to engage multiple latent wicked issues.

Affordance 1. Recurrent Cycles of Spin-off Strategizing

The collective toolmaking process invited extensive strategizing of the articulated problem: 'how to foster better partnership relationships with diverse stakeholders?'. As managers unpacked this tangled issue, they opened Pandora's box and a host of interlinked issues were surfacing: 'How do we get public sector stakeholders to buy into partnering?', 'How do we get sister companies on board?', 'Which systems need to change?'. In M1, for instance, managers discussed system issues that were hurting partnerships, which then prompted further discussion about disunities between internal business units that were hampering transitions (Table III). As managers surfaced and explored these issues, strategic discussions broadened. For example, when Linda explained how ZCorp needed to tackle service performance issues, the conversation suddenly turned to the efficacy of investments in community initiatives, being used to build goodwill: 'I think people are thinking, for Heaven's sake, can't you spend this money on improving the service'. While this had little to do with the partnering model, it led managers to conclude that these investments were counterproductive and needed to be reallocated to services.

Thus, strategizing was emerging from a loosely bounded exploration of the articulated problem (Figure 1B), often broadening as new issues surfaced. As the following vignette exemplifies, the strategic dialogue was often free-flowing.

> Vignette 1. Paul: 'different hospitals have a different view of what they want and the extent to which they buy into partnership'. They share war stories about clients and discuss how the model might work in the 'more difficult' partnerships. They talk about building an evidence base. Linda says, 'I've got to say, I don't think it's just about clients and us. I was telling Rob, it's our partners' language and behaviour that's the problem'. They begin talking about public sector values and language problems amongst ZCorp partners and what can be done.

In this vignette, the dialogue shifts fluidly from partnering challenges (client pluralism, difficult partnerships) to possible solutions (building an evidence base), to new partnering challenges (the language and behaviour of ZCorp partners). While the material tool imposed some initiating structure on these discussions, developing concepts, categories, and figures were tentative and not strong enough to bind explorations to any particular topic or line of reasoning. Thus, an unencumbered exploration of issues ensued, enabling managers to work through surfacing problems, crystallize issues and, occasionally, generate ideas that fed into the material tool production.

Just as frequently, however, managers were engrossed in conversations and followed the trail of tangential issues, which often caused discussions to veer-off in unanticipated ways. This encouraged bouts of impromptu strategizing as managers took advantage of possibilities, as and when they surfaced, to engage latent wicked issues. Vignette 2 illustrates how strategic conversations would frequently branch-off in non-linear ways, beyond the scope of the toolmaking or articulated problem (Figure 1C).

> Vignette 2. James and Linda begin discussing how the model could help in the market. Jane says, 'we should also be collecting market intelligence to "tap into the hidden motives" of the key decision makers'. We need to 'tailor our pitch' so that their project manager can 'look good' when they take it to their board! Rob says, 'this is a really useful train of thought'. They discuss how this could work and James adds, 'we should also sell our one-stop shop strategy […] we invest, we build, we operate. We should sell how we are able to deliver all of it and get across to the client the benefits of buying from a one-stop shop'. There is agreement this could strengthen ZCorp's value proposition and Jane concludes the detour: 'We should have a hard look at how we are approaching the client'.

In this vignette, impromptu strategizing is directed at the problem of overcoming market problems to win more business, going well beyond the confines of developing a partnering model. The managers discuss market intelligence and market strategies, and new ideas are generated about 'tapping into the hidden motives of influencers' and strengthening ZCorp's competitive position by selling the 'one-stop shop'. Such episodes of spontaneous strategizing were less frequent than tool-centred strategizing, but often provoked consequential strategic discussions. For example, in M1 there was an impromptu discussion about ZCorp's external image and how the company is perceived. Rob instigated this when he remarked: 'We're broadening the conversation now, but there is an issue as to their view of our capability of helping them with their educational performance, I don't think they see we can help'. This then prompted managers to strategize about

how ZCorp could overcome misperceptions in the market, particularly among prospective clients. Again, these strategic discussions were outside the articulated scope of the toolmaking, but managers seized on possibilities to 'go off track' and strategize different facets of the wicked problem whenever opportunities presented themselves. Through the course of the toolmaking, we observed numerous unplanned exchanges about strategic issues: mitigating negative images, improving ZCorp's competitive position, amending contractual practices, developing offerings, changing culture etc. For instance, the earlier mentioned discussion about contractual services (Figure 2ii) had prompted Linda to claim that ZCorp, and their sister companies 'need cultural change'. This prompted further exchanges about ZCorp's identity and values and whether these were consistent with the changing PPP environment.

In sum, recurrent 'cycles of spin-off strategizing' (Figure 1D) emerged as strategic discussions ebbed and flowed between the material making, exploration of the articulated problem and broader detours into unarticulated dimensions of the wicked problem. As we discuss below, these detours helped managers to indirectly engage a complex wicked problem and accumulate strategic value.

Affordance 2. Unfolding Discovery of Latent Ambiguities

A second unintended affordance was an ongoing discovery of latent issues and ambiguities (Figure 1E). Rob's initial model had embodied *his* beliefs about how ZCorp should partner. This had been stymied by influential managers, including Linda, James, and Ken, who were sceptical about the efficacy of the model's prescriptions. These managers worked at the coalface and had differing views, anchored in their own experiences and functional proclivities. While managers were aware that different perspectives existed (see Table IV, B1), these had never, as far as we could tell, been explored in a meaningful way. As the managers strategized about partnering problems and broader issues, divergent interpretations, and assumptions increasingly surfaced, leading to the discovery of external and interface ambiguities (see Table IV).

External ambiguities were apparent, for instance, when managers voiced diverging views about clients and sectors. Rob believed the sectors were similar from a partnering standpoint: 'I don't think the Education and the Healthcare model will be different'. However, Paul stressed that 'healthcare is a more complex beast […] with a plethora of power bases'. Yet, when James pointed to some key difference in healthcare, 'NHS Trusts want to be best in class', Linda vehemently disagreed, arguing that the sectors were similar (Table IV, A2). Ambiguities also surfaced about internal practices at the partnering interface. For example, when Linda was discussing partnering protocols, she opined that 'there are three or four versions being used' which was at odds with what others believed. It also became apparent that managers interpreted 'partnership' differently (see Table IV).

> Vignette 3. Linda challenges the others' claim that Alpha is ZCorp's best partnership. Rob quizzes Linda, 'Why do you disagree?'. Linda argues that performance and reporting is not what it should be and ZCorp and its partners are not delivering their service obligations: 'if we are judging the partnership in terms of delivering service I

Table IV. Illustrative examples of discovered ambiguities and subsequent manifestations in the partnering model

Ambiguity	*Representative examples of discovered ambiguities*	*Discovered ambiguities shaping the partnering model*
A. External ambiguities: different views about sectors; incongruent beliefs about clients; divergent assumptions about receptivity to partnering	External ambiguities surfacing in M1, M2 and M4 • A1. Rob: 'the partnership fundamentals are the same.' James: 'there's big difference between the sectors' (M1) • A2. James: 'the card we're starting to play is assisting the hospitals to deliver their strategic vision. So it takes it to a higher plane. Now, that's different to education because the Council aren't quite having these strategic visions and wanting to be best in class'. Linda disagrees: 'They do. They do. In education they want to stand up in front of the DCFS and say, "we are the best" […] I don't see much difference' (M1) • A3. Paul: 'Healthcare is a more complex beast. Part of that is weighing up the sources of power and influence […] There are competing clients almost and the usual plethora of hospital power bases – doctors, nurses and all the rest of it. It's a nightmare to pin down their strategy and I still don't think we know what the right thing to do is' (M4)	Building more 'flex' into the model • Rob initially pushed for a universal model to be rolled-out. However, divergent views about sectors and clients led to an attempt to balance universality with flexibility • Rob asks: 'So there is agreement we can have consistency?'. James: 'I think we should. It may be options, you know, education may not have options A and C, or education might want options A, B, C' (M1) • James: 'we should have one basic framework for both sectors that can be customized.' This will allow managers a degree of flexibility to make the model work e.g., a 'few education things might hang off and a few healthcare things might hang off, but we want the basic skeleton to be the same. The goal is to have one standard partnering skeleton' (M2) • Jane: 'We all agree we need a model that can flex, that can move' (M4)

Table IV. *Continued*

Ambiguity	*Representative examples of discovered ambiguities*	*Discovered ambiguities shaping the partnering model*
B. Interface ambiguities divergent views about the meaning of partnership; disagreements about what good partnership means; contending theories about building partnerships	Partnering interface ambiguities surfacing in M1, M2 and M4 • B1. Rob: 'every client has a different view of what partnering is!'. Jane: 'well every one of our staff have as well!' (M1) • B2. They talk about what constitutes 'good' partnership. Pam and Rob think AlphaPPP is the best example. They are surprised when Linda challenges this: 'I disagree'. Rob emphasizes the positive nature of the relationship and client perceptions, but Linda disagrees: 'just because we 'get on' does not mean it's a good partnership'. As they discuss it becomes clear that they have very different perspectives (M1) • B3. Rob: 'I think we've established that partnering is something that happens at the client level'. Linda: 'have we? I don't!'. Rob: 'I think we have'. Ken: 'Look, where we're falling down is, we're not providing the basics'. They debate the distinction between partnering and partnership. The managers tie themselves in knots trying to make these distinctions. Rob eventually says: 'OK, I think we should move on (laughing)' (M2)	Adding diverse perspectives expands the model and equivocality • Linda: 'I think operations should be more of an iterative learning process? Operationally we should encourage continuous improvement'. Rob translates this into a new 'continuous improvement' schematic • Ken: 'The model is missing this relational dimension […] it's like we have the workshop and that's it. But that isn't going to do it, it's an attitude and way of life, that's what's missing'. Jane agrees. Rob adds new text to the model titled, 'Partnership behaviours' with generic terms like 'integrity', 'mutual respect' and 'cooperation' included (M2) • Expressions are explored to try and agree on a definition of partnership. Different managers suggest words e.g., 'listening', 'delivering', 'performing', 'engaging', 'understanding', 'learning'. Many of these expressions are added. We counted 5 equivocal terms in the initial model. The final version contained 36 new equivocal expressions, such as 'responsiveness', 'communication', 'delivery' and new leitmotifs associated with 'service delivery' and 'performance'

would disagree'. Rob: 'Hang on, service is what the customer perceives as good service!'. But Linda challenges this: 'So because we all get on so well, is that therefore a good partnership? Good partnering is about challenging. I don't think we would find much in Alpha PPP'.

In this exchange, Linda questions the assumption that partnership is primarily about relationships. To her, effective partnership was about 'performance delivery' and 'challenging each other'. Rob, by contrast, believed better structures – i.e., meetings, workshops and measures – were the answer to partnering problems. Others challenged this: 'it makes it sound as though partnering is something you do in a meeting!'. Ken argued that partnership is about relationships, 'the way everybody interacts to resolve issues'.

When we examined these ambiguities, we found that ambiguities were unintentionally inscribed into the material tool (Figure 1H). For example, Rob had pushed for a 'one size fits all' model that aligned with his views. However, discovered ambiguities about clients and sectors led the managers to develop the model in ways that could 'flex' and 'move' (see Table IV, 'Building more flex into the model'). Thus, some consistency was retained ('one basic framework') but future users were afforded more flexibility to 'customize' and 'select options A, B, C' to make the model work locally. For example, managers could use partnership boards with representatives from all stakeholder groups (Rob's preference) or they could use 'board-to-board high level meetings' (James and Ken's preference).

Diverse meanings and viewpoints also stretched the strategy tool and increased equivocality (see Table IV). Through the course of meetings, the model expanded from 8 slides to 17 slides with new diagrams, figures, and text. Many additions could be traced to individual interpretations. A new diagram, distinguishing stakeholder expectations and service delivery, accommodated James' and Linda's view that contractual services were essential. A complicated spiral diagram was added which represented Linda's view that the model should be more of an 'iterative learning process'. Furthermore, when managers could not agree on details, they settled for abstractions. Consequently, the model became sprinkled with equivocal terms like 'best practice', 'purposeful delivery' and 'continuous improvement', which could be interpreted differently by users. Thus, the desire to accommodate divergent ideas and interpretations naturally expanded the model, making it more representative, but also more abstract and equivocal.

The Locus of Strategic Value

Our findings show how the strategic value of collective toolmaking extends beyond the material tool produced (Figure 1F). When ZCorp managers set out to develop the partnership model, they intended to produce a strategically valuable tool for future users. However, the unintended process affordances identified accumulated strategic value, which was distributed across the material making, articulated problem and unarticulated wicked problem domains. For example, Table III (column 2) illustrates how strategic value generated from strategizing discussions was often *not* apparent in manifestations of the tool (Figure 1G). When we looked across the corpus of data, examining over 50 instances of problem-centred exploration, less than half resulted in a change to the tool.

Yet, these problem explorations allowed managers to surface and debate key issues, generate strategic insights and formulate practical coping responses. Revelatory discussions

about clients, services, communications, and internal practices provided 'a lot more clarity' (James) and impromptu discussions allowed managers to formulate tentative action plans in situ. For example, in M2 Rob and James agreed to meet with the CEO of a sister company. Linda and Ken agreed to work on 'improving operational systems to get more continuity' and there were numerous implicit agreements, for example, to reallocate resources, introduce training, instigate behavioural change, and develop managers.

Likewise, when spin-off strategizing moved into the unarticulated wicked problem domain, subsequent discussions rarely impacted the strategy tool; conversations were too far removed. Yet, these explorations enabled actors to surface, unravel, and strategize obscure areas of the wicked problem. Impromptu strategizing shaped plans, changed resource allocations, and produced strategic action. For instance**,** the decision to 'have a hard look at how we are approaching the client' led Paul to revisit ZCorp's bidding toolkits. Discussions about ZCorp's behavioural and cultural problems led managers to decide to introduce new training and to recruit more people with public sector experience who could 'speak their language'. Following M3, an initiative was launched to define ZCorp's fundamental values, with company-wide workshops used to encourage employee buy-in. While managers never set out to engage with such a broad agglomeration of issues when they began the strategy toolmaking, the open-ended nature of the design process, and tangled nature of the wicked problem, persistently invited them to do so.

Finally, the unfolding discovery of latent ambiguities helped to mitigate the confusion, discord, and disunity that was festering inside ZCorp. For example, disagreements spurred fruitful debates and increased managers' sensitivity to each other's positions, helping to nurture more cohesive understandings. More speculatively, the translation of ambiguity – e.g., divergent ideas, interpretations, preferences – into the tool (Figure 1H) may have inadvertently helped to produce a workable and flexible tool that better corresponded with the pluralistic setting. The collective toolmaking loosened the prescriptions in Rob's 'one size fits all' model, which, according to informants, would not have worked.

CONCEPTUALIZING THE PROCESS AFFORDANCES OF TOOLMAKING

Our analysis revealed how the sociomaterial process of strategy toolmaking generates two unintended process affordances, 'recurrent cycles of spin-off strategizing' and 'unfolding discovery of latent ambiguities', that inadvertently invite managers to explore, comprehend and strategize wicked problems. These unintended affordances are depicted as an expanding spiral in our emergent model (Figure 3). They emanate from the material making (Domain A) and 'radiate outwards' (Chia and Rasche, 2015, p. 49) as immersed actors wrestle with derivations of the articulated problem (Domain B) – e.g., engaging public sector stakeholders, tackling contractor relations, improving services – and spin-off into broader and unarticulated aspects of the wicked problem (Domain C).

In the 'material making domain' practitioners instantiate emerging ideas into materials: constructing the strategy tool through a cyclical process of 'idea generation', 'material translating', 'material showing' and 'critical reviewing'. Here, managers work as designers, imagining 'that-which-does-not-yet-exist' (Nelson and Stolterman, 2003, p. 9), having reflective conversations with materials (Schön, 1992) and negotiating the content

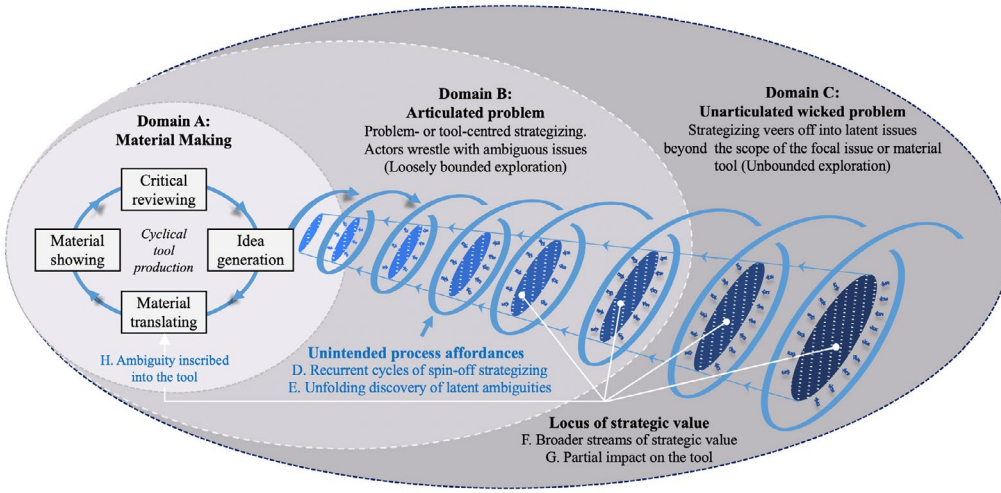

Figure 3. The process affordances of strategy toolmaking when addressing wicked problems

of the tool (Stigliani and Ravasi, 2012). This material making creates a sociomaterial platform from which actors begin to purposefully engage, explore, and strategize the articulated problem the tool is being designed to address.

In the 'articulated problem domain' practitioners ostensibly focus on a graspable, yet incomplete, object of knowledge (Knorr Cetina, 2001; Werle and Seidl, 2015). As Churchman (1967, p. 141) noted, managers often try to tame wicked problems by 'carving off a piece of the problem' and seeking a rational solution to that piece. Having articulated a 'piece' of a wicked problem – e.g., 'to improve the firm's partnering process' – actors zoom in on the epistemic object, which is incomplete, ambiguous and 'question-generating […] with the capacity to unfold indefinitely' (Knorr Cetina, 2001, p. 186). This capacity for explorations to unfold is pronounced when engaging wicked problems because the 'solution space is unbounded' (Pries-Heje and Baskerville, 2008, p. 731). As actors explore the articulated problem they habitually 'pull on the threads' of tangled issues, causing discussions to 'spin-off' (Figure 3D) in non-linear directions, such that the scope of explorations spontaneously widens (Knorr Cetina, 2001). This continual 'branching off' pushes actors into 'the unarticulated wicked problem domain' where they discuss, debate, and strategize multifarious issues – e.g., adapting to a complex pluralistic environment, dealing with the challenge of delivering complex infrastructure projects, mitigating cross-sector tensions, addressing internal cultural problems, tackling negative images – which are all symptoms of a messy and indeterminate wicked problem (e.g., Walker et al., 2017) that is broader than the articulated scope of the toolmaking.

It would be easy to dismiss these impromptu detours as unhelpful deviations, where actors wander 'off track' or temporarily lose focus; indeed, past studies emphasize the importance of setting clear limits on explorations (e.g., Werle and Seidl, 2015) and how generic strategy tools bracket discussions (Jarzabkowski and Kaplan, 2015). However, our findings reveal the value of impromptu detours, unbounded exploration, and

spontaneous strategizing when dealing with wicked problems that cannot be clearly articulated or tackled with preconceived models (Camillus, 2008; Walker et al., 2017). When actors try to tackle a wicked problem, there are a multitude of unvoiced, unconsidered, and unknown issues, along with underlying ambiguities and tensions (Schad and Bansal, 2018). As Rittel and Webber state (1973), formulating a wicked problem is the principle problem. When managers engage wicked issues, understanding remains elusive and problems are difficult to grasp (Camillus, 2008). This accords with Chia's (2011, p. 182) assertion that 'full understanding and comprehension of complexity eludes us' and 'retreats into the shadows when directly confronted'. Nevertheless, making a strategic tool *de novo* can unintentionally help managers to disentangle complex issues, discover latent ambiguities (Figure 3E) and produce practical coping actions. As we showed, much of the strategic value generated was not located in the material strategy tool produced (see Table III and Figure 3F-G); rather, it was cumulatively built-up from a series of small, in-the-moment, seemingly unremarkable coping actions (Chia and Holt, 2009). Over the course of the toolmaking, actors oscillate between the three domains, generating value as they go. In the material making domain a new tool is created and discovered ambiguities are inadvertently inscribed into the strategy tool (Figure 3H), creating a contextualized model for users (Jarzabkowski and Wilson, 2006). In the articulated problem domain managers loosely explore the articulated problem (Werle and Seidl, 2015), have strategically consequential discussions, develop new understandings and formulate action plans. When cycles of spin-off strategizing take managers into the unarticulated wicked problem domain, they unearth latent issues (Schad and Bansal, 2018) and strategize 'on the hoof' to produce unintended revelations, practical solutions, and new commitments (Bouty et al., 2019).

DISCUSSION AND CONCLUSION

Our findings have important theoretical implications for the study of strategy tools (Jarzabkowski and Kaplan, 2015), strategy-as-practice (Vaara and Whittington, 2012), and strategic ambiguity (Abdallah and Langley, 2014).

Implications for the Study of Strategy Tools-In-Use

First, this paper extends the 'tools-in-use' literature (Jarzabkowski and Kaplan, 2015) by revealing how the collective process of strategy toolmaking (Glaser, 2017; Mikes and Zhivitskaya, 2017) can generate unintended affordances that help managers to address wicked problems. In the 'tools-in-use' paradigm practitioners select from a pre-existing repertoire of generic strategy tools to facilitate strategic decision making. However, this can encumber managers with inappropriate theoretical prescriptions (Vuorinen et al., 2018; Wright et al., 2013) and tool affordances that limit and constrain discussions (Jarzabkowski and Kaplan, 2015). The *de novo* development of strategy tools, by contrast, allows managers to explore beyond preconceived boundaries to reap the value-generating benefits of 'spin-off strategizing' and the 'discovery of latent ambiguities'. Thus, instead of approaching a wicked problem with a preconceived map in hand – 'knowing before we go' – toolmaking invites actors to step into the unknown to develop

'an incomplete but practically sufficient comprehension of the situation in order to cope effectively with it' (Chia and Holt, 2009, p. 159). Thus, our findings question whether academics and consultants are always best placed to develop strategy tools (Moisander and Stenfors, 2009; Vuorinen et al., 2018). Indeed, the desire to provide predetermined answers to unprecedented problems may unwittingly encumber managers, denying them the value generation possibilities that can emerge when practitioners collectively theorize wicked problems and design tools for themselves. Our study, therefore, provides an initial empirical step towards unpacking the practices and affordances of collective toolmaking, and contributes to a nascent line of inquiry (Glaser, 2017; Jarzabkowski and Kaplan, 2015) that future research may advance further.

This study also offers a processual conceptualisation of affordances that can inform future studies of toolmaking and material making. Research has used Gibson's (1977, 1979) theory of affordances to examine the action possibilities that a material object 'favors, shapes, or invites' and constrains (Orlikowski and Scott, 2008, p. 453). While scholars have recognized the relational ontology at the heart of affordance theory (Gibson, 1977), there has been a tendency to focus on the affordances of artefacts, and to treat affordances as relatively fixed and purposefully designed (Demir, 2015) – i.e., 'each tool has its own affordances' (Jarzabkowski and Kaplan, 2015, p. 550). Our study offers a processual and ecological interpretation of affordance theory, where activity affords activity (Gibson, 1977), and affordances are revealed as actors perceive, pick-up and act on possibilities that become available in an unfolding environment (Ingold, 2000; Rietveld and Kiverstein, 2014). This processual conceptualisation was vital to explaining how unintended cycles of spin-off strategizing were continually 'manifested in the flow of ongoing perceiving and acting' (Heft, 2003, p. 151). This theoretical elaboration provides an avenue for future scholarship to capitalize on the potential of affordance theory to explicate sociomaterial processes and non-deliberate patterns of action in other contexts.

The Value of Impromptu Detours and Spin-Off Strategizing in Strategy-Making

This study also contributes to strategy-as-practice scholarship (Vaara and Whittington, 2012) by casting light on the role of impromptu detours and spontaneous strategizing. Discussions of strategy development often draw a clear line of demarcation between planned and emergent strategy (Regner, 2003), building and dwelling worldviews (Chia and Holt, 2006; Heidegger, 1971) and purposeful and purposive action (Bouty et al., 2019; Chia and Holt, 2009). For example, Chia and Rasche (2015, p. 45) describe building and dwelling worldviews as 'epistemological alternatives for researching strategy as practice' where 'each produces significantly different explanatory outcomes'. Although these are distinct concepts, our study illustrates how these opposing modes of engagement operate concurrently during strategy toolmaking, creating a dynamic and valuable interplay between intentional action – the deliberate design of a strategy tool – and unintended action – the non-deliberate and non-linear exploration of wicked issues.

When actors create a strategy tool to solve an articulated problem, they work in accordance with a building worldview; namely, strategy-making is deliberate and purposeful

(Bouty et al., 2019; Chia and Rasche, 2015) and 'strategic action is explained through recourse to the intention of actors' (Golsorkhi et al., 2015, p. 8). However, as we showed, this deliberate process creates a sociomaterial springboard for 'recurrent cycles of spin-off strategizing', which constitutes an immersed, indirect and unintended modus operandi, consistent with a dwelling worldview (Heidegger, 1971; Ingold, 2000) and conceptions of wayfinding (Chia and Holt, 2009; Ingold, 2000). Here, strategy-making is not the product of 'intention and purposeful goal-orientation' (Chia and Holt, 2006, p. 635). Rather, it is unintentionally produced out of practical coping actions taken in situ (Chia and Holt, 2009). In contrast to research which juxtaposes building and dwelling, and purposeful and purposive action, as opposing modes of doing strategy (Bouty et al., 2019; Chia and Holt, 2009; Chia and Rasche, 2015), our study points to an integrative relationship, where both unfold co-jointly in a complementary and recursive relationship. This opens up intriguing possibilities for actors to deliberately use strategy toolmaking as a vehicle to stimulate emergent strategic action when facing wicked problems.

Our concept of 'spin-off strategizing' also complements and extends existing studies of material making. Previous works have observed how creating artefacts 'can take strategy meaning making in unexpected directions' (Knight et al., 2018, p. 918) and precipitate 'spurts of innovation' (Boland et al., 2007, p. 644). However, unexpected detours are often side notes. As Comi and Whyte observe, scholars typically miss 'the habituated and spontaneous actions of practitioners dwelling into visual artefacts' (2018, p. 1060). Our study illuminates how impromptu 'detours, lingerings and directional changes' (Chia and Holt, 2009) provide an indirect way through the labyrinthine complexity of wicked problems. That is, strategy toolmaking manifests 'recurrent cycles of spin-off strategizing' where actors 'seize on the wing of possibilities that offer themselves at a given moment' (de Certeau, 1984, p. 37). Spontaneous strategizing detours are not premeditated or planned; rather, managers 'decide while acting' and take 'spontaneous action without preparation' (Hadida et al., 2015, p. 440). As managers react to emerging ambiguities, issues, and tensions in the flow of interacting, sociomaterial interactions invite managers to instantaneously move through the complex landscape of a wicked problem in any direction they see fit, unintentionally producing a stream of practical coping actions that accumulate value.

These insights transcend existing studies of material making that have tended to underplay spontaneous activity (Comi and Whyte, 2018). Moreover, our study provides empirical credence to Chia's (2011) conceptual argument that 'the act of detour' and 'oblique strategy' may offer an important means for managers to access, apprehend and cope with the elusive nature of complex strategy problems (Chia, 2011, p. 183). As Chia notes, some strategy problems are just too complex to be comprehended 'head-on' (Chia, 2011, p. 184). We show how strategy toolmaking invites a dwelling mode of engagement, where latent issues can be progressively surfaced, explored, and tackled through circuitous cycles of spin-off strategizing. Thus, we add theoretical depth to research, examining the practice of strategy-making when addressing complex (Chia, 2011), intractable (Bettis, 2017), pluralistic (Denis et al., 2007), and wicked problems (Camillus, 2008), by drawing attention to the 'silent efficacy' of indirect strategy and wayfinding (Chia and Holt, 2009, p. 186; Chia, 2011).

The Unfolding Discovery and Translation of Latent Ambiguities into a Material Tool

Finally, our findings advance understanding of how strategic ambiguity becomes woven into materials (Eisenberg, 1984, 2007). Studies of strategic ambiguity – defined as 'purposefully equivocal communication' (Abdallah and Langley, 2014, p. 237) – have drawn attention to how actors intentionally write ambiguity into strategy texts to accommodate divergent preferences, build consensus, and stimulate collective action (Abdallah and Langley, 2014; Davenport and Leitch, 2005; Denis et al., 2011). Thus, strategic ambiguity is conceptualized as a purposeful device that producers use to encourage participation (Abdallah and Langley, 2014; Eisenberg, 2007).

We extend this literature by highlighting how actors discover and unintentionally translate strategic ambiguity into a strategy tool. Our concept of 'unfolding discovery of latent ambiguities' (Figure 3E) captures how toolmakers surfaced divergent meanings, incongruent beliefs and underlying tensions (see Table IV). This is not surprising; wicked problems are replete with social complexity (Conklin, 2006) and paradoxical tensions that 'lie dormant, unperceived, or ignored' (Schad and Bansal, 2018, p. 1495). When actors unravel these problems, they 'open Pandora's box' and confront multiple ambiguities – e.g., different interpretations of wicked issues, or different views about how the strategy tool should be designed (see Table IV). Managers face the problem of resolving these growing ambiguities (March and Olsen, 1976) and accommodating divergent meanings in the joint material tool being constructed (see Spee and Jarzabkowski, 2017).

We show how actors respond to this challenge by translating surfacing ambiguity into the tool, enabling them to move forward and avoid getting stuck in indecision (Denis et al., 2011). This translation process is a recursive and fluid accomplishment that happens imperceptibly as actors work in the material making domain. A kind of inflationary consensus unfolds (Denis et al., 2007) where alternative concepts, interpretations, and perspectives 'stretch' the model, adding flexibility, equivocality, and abstractions. When managers need to compromise, they tend to include different suggestions rather than choosing between them. When designing the tool, they settle on abstract representations to accommodate multiple viewpoints. Thus, ambiguity in the group becomes instantiated in the material tool, making it more equivocal (see Table IV and Figure 3). This could be seen as 'postponing' or 'avoiding' contentious issues (Denis et al., 2011), but this translation process also works like a release valve that enables managers to keep moving through disagreements and tensions during the strategy toolmaking process.

This process of translating strategic ambiguity resonates with Spee and Jarzabkowski's (2017, p. 173) argument that 'ambiguity constitutes a fluid, unfolding accomplishment, as ambiguous terminology is discussed and modified to accommodate participants' multiple meanings'. However, we go further in illuminating how this unfolding accomplishment is, to a large degree, an unintentional by-product of the making process. Thus, we cast light on how the production of strategic ambiguity can be an implicit, nondeliberate, and purposive accomplishment (Chia and Holt, 2009), not just a purposeful one (Eisenberg, 2007).

We cannot say if this translation of ambiguity improved the efficacy of the tool for future users, as we did not study how actors used the created strategy tool. However, this

process 'democratized' the toolmaking, enabling more managers with different views, preferences, and meanings to influence and shape the composition of the tool. In our case, early instantiations of the tool were fairly standardized. It was only through the process outlined that the 'one-size-fits-all' tool was made to 'flex', arguably giving users more interpretative freedom and discretion to 'customize' their approach in a pluralistic setting, while simultaneously encouraging consistency across the portfolio. We can only speculate, but this may have led to a more environmentally congruent strategic tool that aligned with the 'lived experiences' and 'practical needs' of managers (Moisander and Stenfors, 2009).

Boundary Conditions and Avenues for Future Research

The process affordances in our model are likely to be valuable in other settings when three conditions are in place. First, actors are facing a strategic problem that is ambiguous, complex, and indeterminate, such that generic strategy tools appear to offer no answer (Camillus, 2008). This condition is not exclusive to wicked problems and strategy toolmaking could be valuable in any context where managers are facing high levels of complexity and pluralism – e.g., inter-organizational collaborations, mergers, disruptive innovations (Camillus, 2016). Second, we speculate that the unintended process affordances identified in our model will be most apparent when there is weak structure – e.g., no existing tool, no facilitator or no guiding methodology working to constrain the process. Wayfinding requires space for actors to 'know as we go' (Chia and Holt, 2009, p. 159) and 'stay "a-while" with things' (Comi and Whyte, 2018, p. 1058). While more open-ended facilitated interventions (Conklin, 2006) could precipitate unintended affordances, such as spin-off strategizing, we speculate that increased structure will result in a corresponding reduction in unintended process affordances. Third, the unintended process affordances outlined require actors to be highly motivated to find a practical response. As affordance theory suggests, what gets detected or 'picked up' will be shaped by the needs, intentions, and abilities of the actors, the constraints they are operating under, and what they see as valuable in-the-moment (Costall, 1995; Gibson, 1979; Heft, 2003).

This study points to several new avenues for future research. First, future research could usefully compare the process affordances reported here with those generated when managers modify and adapt generic strategy tools (Chelsey and Wenger, 1999; Jarratt and Stiles, 2010; Jarzabkowski and Kaplan, 2015), particularly when dealing with complex, wicked or pluralistic strategy problems (Camillus, 2008; Denis et al., 2007). Our comparative arguments are speculative, as we draw from our in-depth ethnographic study and theoretical arguments. Theoretically, however, we suggest that modifying and adapting generic strategic tools will, relatively speaking, work to suppress and subdue spin-off strategizing and spontaneous activity, as actors are influenced by the rationality carried by tools (Cabantous et al., 2010; March, 2006) and steered towards pre-existing constructs, propositions, and decision rules (Moisander and Stenfors, 2009; Wright et al., 2013). Second, how pervasive is collective toolmaking in contemporary organizations? While the literature provides a reasonable understanding of how managers reconfigure and adapt generic tools, we know far less about why, where, and how the *de novo* development of strategy tools happens (Jarzabkowski and Kaplan, 2015, p. 552; Glaser, 2017).

Informal discussions with managers suggest that in situ toolmaking is widely used, but research is needed to gain a clearer picture of this practice. Finally, our investigation raises critical questions about participation (Laine and Vaara, 2015). Our study is limited insofar as we studied an in-depth case of senior managers engaging in strategic toolmaking. However, what remains unanswered is the role middle managers, frontline employees, external partners, and other professionals could play in strategy toolmaking processes, which would presumably alter the process dynamics.

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