

Beyond Better Solutions: Design Thinking as a Social Technology

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The value delivered by design thinking is almost always seen to be improvements in the creativity and usefulness of the *solutions* produced. This paper takes a broader view of the potential power of design thinking, highlighting its role as a *social technology* for enhancing the productivity of conversations for change across difference. Examined through this lens, design thinking can be observed to aid diverse sets of stakeholders' abilities to work together to both produce higher order, more innovative solutions *and* to implement them more successfully. In this way, it acts as a facilitator of the *processes* of collectives, by enhancing their ability to learn, align and change together. This paper draws on both the author's extensive field research on the use of design thinking in social sector organizations, as well as on the literature of complex social systems, to discuss implications for both practitioners and scholars interested in assessing the impact of design thinking on organizational performance.

Introduction

One of the central themes in both practitioner and scholarly conversations today, across disciplines, is the acceleration of the complexity and uncertainty that organizations face, and the premium this places on creativity and innovation. Across virtually all sectors of the economy, there is a sense that organizations need to change in fundamental ways if they are to successfully adapt. In design, we talk about "wicked" problems, biologists talk of complex adaptive systems, behavioural economists focus on evolutionary growth theory; behind all of these differences in nomenclature lies a widespread suspicion that the mechanisms that ensured survival and indeed prosperity in a stable and predictable



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world - ones based largely on hierarchical control - are likely to be ill-suited to an increasingly complex and uncertain new one.

Those of us working in the design thinking space have been major beneficiaries of this fear - as from time immemorial, when those toiling at the periphery of fields suddenly find themselves in demand as the inadequacies of mainstream approaches reveal themselves. In what seems to me to undoubtedly fortuitous timing from our career standpoints, design thinking is enjoying unpredicted popularity. We are suddenly seen as potential possessors of the latest Holy Grail - the famed "silver bullet" - capable of miraculous things. Though research on its impact on organizational performance is just getting underway, we find design thinking at work in nearly every sector of the global economy, in organizations as diverse as social innovation start-ups, global corporations, NGOs, national governments and elementary schools. It has been adopted by entrepreneurs, corporate executives, city managers, and kindergarten teachers alike. In just a small sample from our own research, we see it employed to address issues ranging from processing vendor invoices in Istanbul, to increasing blood donation in Peru, helping impoverished farmers adopt new practices in Mexico, keeping at risk California teenagers in high school, and reducing emergency room visits in Dallas, Texas and patient stays in Melbourne, Australia.

In cases like these, the value delivered by design thinking is almost always seen to be improvements in the creativity and usefulness of the *solutions* produced. My research suggests a much richer set of benefits, ones that link to the accelerating complexity and uncertainty noted earlier and, in this paper, I want to set out some hypotheses around a broader role for design thinking: as providing an enabling *social technology* that facilitates adaptation and effective problem-solving in complex social systems. By first improving the quality and productivity of *conversations*, design thinking not only does the job we expect it to do - identifying more creative solutions - it increases the likelihood of their implementation, by enhancing a collective's ability to align, learn, and change together.

In this paper, I review the literature spanning a diverse set of disciplines at both macro and micro levels, on complex adaptive systems, innovation team performance and learning in action in order to explore the challenges to decision-making they highlight. From this review, a series of facilitators identified in previous research as critical to the performance of collaborative innovation is distilled. I then discuss examples from my research that illustrate how design thinking contributes to accomplishing these imperatives, and advance an argument that it provides more than a problem-solving process - it provides a social technology.

What is a social technology?

Though today we associate the term "technology" with digital or physical ways of accomplishing activities, technology has a much broader meaning. Derived from the Greek, meaning "science of craft," it refers to a collection of techniques, skills and processes used to transform knowledge into practical outcomes (Wikipedia, 2017). Thinking about "social" technologies (in contrast to physical ones) has somewhat surprising roots in the field of economics: leading evolutionary economist Richard Nelson first drew the differentiation between "social" and "physical" technologies in a discussion of the limits to productivity improvements made by the introduction of new physical technology that ignored the accompanying social dimension (Nelson & Sampat, 2000). He tied the two through the notion of the centrality of "routines" (ways of doing things,

courses of action) which he and Sidney Winter (1982) made famous as the basis of evolutionary growth theory. Successful behavioural change, Nelson argued, requires attention to social mechanisms in order to succeed, bringing a human-centred aspect to economics. He argued that institutions themselves were forms of social technology, and that routines were the basic way that they accomplished change. This argument spawned a growing literature on the social aspects of physical technology introduction (linked to a corollary literature on the management of change that had been developing for decades). Others have tied the idea of “social technology” to innovation more broadly. Otto Scharmar (2007), in his work on “Theory U” called for a new “social leadership technology” that would allow organizations to “presence” the new future that already lay within. In the context of design thinking specifically, Charles Pezeshki (2014) first used the term to describe design thinking’s contribution, focusing on how it impacted organizational information flows in ways that facilitated higher quality problem solving. Coupling this perspective with research done relating to complex adaptive systems theory yields insights into the mechanisms through which design thinking can contribute significant value well beyond providing better outcomes.

Dealing with Complex Social Systems

Managing within complex social systems is a challenge to traditional approaches - recent research illustrates clearly that the complex reality of social systems is not consistent with convenient simplifying assumptions of the traditional “rational actor” model (Colander and Kupers, 2014) and illustrates two critical outcomes: (1) the failure of hierarchical control as a governing mechanism and (2) the urgency of the need for continuous adaptation through innovation. The failure of control drives the need for de-centralization of decision-making; the need for continuous adaptation drives towards diversity of input.

Complex systems have a set of identifiable characteristics, most notably their rich connectivity which leads to difficulties in centralized control and prediction of cause and effect, driving the need to localize decision-making where possible. The possibility of finding a single system-wide “optimal” solution is low; much of the information and implementation challenges are local, necessitating a de-centralized approach. Network effects play an important role, as well, with how people form and behave in groups tending to overshadow individual behaviour. Efficiency, the dominant criteria in stable, simple systems, must be balanced against the importance of the capacity for resilience and adaptability in complex, unstable systems. Diversity plays an increasingly critical role: though simple, stable systems favour homogeneity and view diversity of input as problematic; in complex social systems, heterogeneity is more valuable because it increases the range of both current information and the breadth of solutions generated. The introduction of new voices helps an organization see more opportunities—ones not necessarily path dependent on previous choices. Thus, local decisions made by a diverse set of actors working together are theoretically likely to be most successful. And, though the larger system is itself complex and difficult to predict, its subunits less so. These components tend to operate on what researchers call “replicator dynamics.” As in a fractal pattern (in which each subunit is a smaller-scale picture of the whole), simple central rules—established globally but applied locally—are the most promising method for bringing order and accomplishing change.

Uhl-Bien and Arena (2017) describe as “one of the great ironies of complexity” that the natural response to increasing complexity is almost always to attempt to impose more

order, which often results in making things worse rather than better (they use the 2016 US Presidential election as a sobering example). Instead, facilitating a new order in which agents in a networked system work together to create something that is emergent is key - “richly connected interactions that allow diverse people, ideas and pressures to collide and combine in ways that generate the emergence of novelty” are required (p.11). Such emergence must be enabled rather than managed, they argue.

Because the bureaucratic systems of large organizations, aimed at imposing standardization and control, are so critical to successful operation of on-going operations, and simultaneously resistant to change, strong informal systems must be established to accomplish this localization. The creation of what Uhl-Bien and Arena term “adaptive spaces” are necessary and are aimed at two objectives: (1) to facilitate the brokerage of information across diverse groups that is needed to deal with the complexity of challenges and (2) to build the group cohesion that enables these networked interactions (outside of the formal organizational systems) to work together successfully. These kinds of brokering activity (Hargadon & Sutton, 1997) and psychological safety (Edmondson, 1999) have consistently emerged as critical to innovation. New structures and routines that centre on developing collective performance norms and coordinating learning and performance enhancement become critical as Gibb, Sune and Albers (2017) demonstrate in their research into how the diverse network of players in the New Zealand Dairy industry worked together to improve their competitive position. Human-centred design approaches have much to offer in this environment, a topic to which we will turn after reviewing related findings from a more micro literature focused on innovation team success.

The Challenge of Innovation and the Paradox of Difference

Working at a more micro level, research on successful research and development teams also contributes to this discussion of the challenges facing organizations as they decentralize decision-making and attempt to tap into a more diverse capability set. Accessing local knowledge and incorporating a more diverse set of perspectives emphasizes working successfully across difference - whether these be differences in functional expertise, in hierarchical levels, across geography or stakeholder groups with different perspectives, or among members of an ecosystem. Leveraging such differences offers the potential to produce better solutions - more systemic, more valuable, and more easily implemented. Yet significant research also suggests that such difference can (and in fact frequently does) drive disagreement and dysfunction. For instance, the extent of a team’s functional diversity was demonstrated by Lovelace, Shapiro, and Weingart (2001) to be a determinant of the amount of disagreement within a team. Similarly, Bettenhausen (1991) concluded, after a comprehensive review of the literature, that diversity generally had a *negative* rather than a positive effect on team performance, especially in times of rapid change: the additional time it took diverse teams to reach consensus offset the positive effect of diverse perspectives. Brown and Eisenhardt (1995) also reviewed a long tradition in product development research that centred on communication within teams and networks, and highlighted the role of disconnects caused by different interpretive schemes of members.

Carlile (2004) argued that the challenges diverse teams face exists because knowledge creation occurs *across* domains, and working successfully across domains is difficult. These

domain boundaries are both interpretive (as team members accord personal meaning to information and events), and political (as different interests clash and impede knowledge sharing). Innovation requires the development of a shared perspective and is difficult because it occurs at the intersection of the 3 types of boundaries that must be crossed that Carlile identified: *difference* due to the need to cross various kinds of specialized expertise; the reality of the *dependence* upon each other that relies on navigating specialized knowledge; and the need for a transcendent *novelty*, or the creation of new, higher order solutions. Thus, in order to work together, diverse team members must successfully *transfer* information, *translate* across interpretive differences, and *transform* to rise above political differences - a challenging set of activities.

Dougherty and Tolboom (2008) studied this challenge and echoed similar themes, suggesting that departmentalized “thought worlds” interfered with the integration of diverse perspectives in cross functional teams which must collaborate. “Departments,” Dougherty (1992) argued, “not only know different things, they know things differently” and have differing “systems of meaning” which lead to different interpretations. Such differences in “ways of knowing” have long been recognized in the psychology literature (Belensky, Clinchy, Goldberger & Tarule, 1986). Dougherty warned that standard approaches to structure and process inhibit success: prescribed roles on teams inhibit cross-fertilization and mutual learning, and pre-determined definitions of issues reduce the search for new possibilities.

Learning theorists have also contributed to the discussion, from a different perspective, because teams cross boundaries not only to coordinate, but to learn as well. In the evolution of their understanding of the phenomena of learning, theorists have moved beyond early views of learning as information processing to a view that knowledge is both personal and context-specific (Nonaka, von Krogh, & Voepel, 2006). Organizational learning has long been acknowledged to be a social phenomenon (Nonaka & Takeuchi, 1995). The creation of new knowledge leading to innovation requires both perspective *taking* - making one’s own perspective visible and reconcilable to others - and perspective *making* - the creation of a coherent belief system (Boland and Tenkasi, 1995). Creating a shared perspective requires surfacing and reconciling differences in knowledge and cognitive frames of reference. Seemingly expedient decision processes like voting that attempt to circumvent the often challenging activities of perspective taking and making fail to create new knowledge, they assert.

Another challenge to the learning that is key to innovation relates to psychological safety and discomfort with ambiguity and uncertainty. Choices are often driven primarily by a fear of making mistakes; many decision-makers have a preference for inaction over action when at risk of failure (Dweck, 2006; Higgins, 2006). Psychological safety is essential to encouraging an action bias, and team psychological safety and learning behavior are closely linked (Edmondson, 1999).

Bruns (2013) studied collaboration across domains of expertise in the field of systems biology, and argued that when complexity and novelty are linked, routines often fail and coordination needs to be on-going. He also noted that arriving at novel constructions in the face of such complexity does more than add an additional layer of coordination - it changes the nature of the work within the individual domains. Members of successful teams, Bruns finds, re-design their work plans to make their contributions more compatible with others and consistently consider the consequences of their work for other domains.

Taken together, these diverse literatures suggest a clear (if challenging) set of imperatives that define what the “adaptive spaces” created within organizations will need to accomplish if they are to help the people within them navigate greater complexity and uncertainty successfully:

- (1) Avoid centralized hierarchical control in favour of de-centralizing decision-making
- (2) Broker information across a set of diverse local actors
- (3) Develop shared meaning and interests and collective performance norms
- (4) Manage on-going coordination of learning and performance enhancement
- (5) Create cohesive groups of diverse local actors that provide psychological safety for risk-taking and accommodate diverse ways of knowing that allow both interpretive and political differences to be overcome

Prescriptions for Success

Fortunately, these same literatures that we have reviewed to lay out the formidable challenges involved in working locally across difference in complex systems, also offer specific actionable insights into how to accomplish this. Their prescriptions are summarized in Table 1.

In the team literature, for instance, Brown and Eisenhardt (1995) note that success in their study was achieved by alignment via concrete tasks, and speed was associated with iteration and testing. Carlile (2004) asserted that boundary crossing required the creation of a common lexicon, shared meanings, and common interests. Successful innovation teams, Dougherty (1992) found learned from each other, mutually adapting through interactions; their definitions were emergent as the work unfolded; and they grounded activities in actual use. Put the product in user’s hands, Dougherty argued, and build a common and comprehensive view from action from these particulars, not abstract goals. Tsai and Ghoshal (1998) looked at value creation from the perspective of social capital, asserting that the cognitive dimension of shared social capital is shared vision. Because new value is created by novel use of resources, mainly through exchanging and recombining, such shared vision is a “bonding mechanism” that increases resource sharing and ability to see potential value and decrease misunderstanding.

Boland and Tenkasi (1995) argued that the creation of new knowledge leading to innovation is often “communities of knowing” questioning and revising routines and, in doing so, creating new processes and relationships. Edmondson (1999) noted, “Learning behaviour in social settings is risky but can be mitigated by a team’s tolerance of imperfection and error.” Edmondson operationalized team learning behaviour as consisting of 5 activities: asking questions, seeking feedback, experimenting, reflecting on results, and discussing errors and unexpected outcomes. Majchrzak, Move and Faraj (2012), however, found that those who succeeded in working across specialties did not necessarily need to transverse (that is, identify, elaborate and explicitly confront) their differences, but instead could adopt a set of practices that allowed them to transcend their differences. They identified practices that included sustained engagement through sharing, summarizing, shifting emphasis to stakeholder criteria and co-creating visual representations and dialoguing around them to re-frame around creative tension. Successful teams were willing to test their representations with external stakeholders and were willing to abandon them when they failed to meet their needs. Rather than debating,

he argued, such successful groups were able to “go with the energy and let go of the idea of one true optimal solution.”

Shin, Picken and Dess (2017) focused specifically on the problems attendant to information sharing and stressed the need to empower employees at all levels, encourage experimentation, challenge the status quo and create a sense of shared purpose.

In the complexity literature, we see an often similar set of interesting prescriptions for action, with writers advocating for “simple rules,” attention to building connections, and providing a safe environment in which to build trust (Uhl-Bien & Arena, 2017). Norman & Stappers (2015) stress the need to shape both cognition and behaviour: social sense-making is critical and co-creation *with* rather than *for* key stakeholders is essential.

Taken together, these prescriptions offer a number of related but discrete bundles of advice for helping diverse sets of actors achieve collaborative innovation:

- provide a framework that offers a common lexicon and simple rules
- focus on concrete tasks and ground the work in tangible actions, rather than abstract goals.
- allow for the emergence of new problem definitions and solutions during the process
- take an experimental approach, seeking outside feedback, tolerating error and imperfection
- seek shared meaning and perspectives
- organize around stakeholder criteria
- emphasize co-creation with stakeholders

Though few of the scholars reviewed here work in the field of design, those who do will note the strong resonance of their prescriptions with the tenets of design thinking. This will be the focus of our final discussion. Having now reviewed a diverse set of literatures to set out then the challenges faced by organizations, as well as prescriptions for successfully surmounting them, we can now return to our initial objective – to examine the linkage between these challenges and prescriptions and the design thinking methodology, in order to test our hypothesis that it does, indeed, provide an enabling “social technology.”

How Does Design Thinking Enable?

In this final section, I will explore, first at a theoretical level and then with specific examples from my research, the way in which design thinking’s methodology and toolkit satisfies the prescriptions reviewed above and is therefore likely to meet the five challenges around de-centralization, brokering, shared perspectives, coordination of learning and group cohesion that we reviewed earlier. This is the heart of the “design thinking as enabling social technology” argument: because design thinking focuses on innovation as a collaborative social process, intimately tied to human emotions and reliant on inexact methodologies in which humans come together and solutions emerge, instead of being imposed, it offers a set of tools and processes capable of facilitating adaptive innovation in complex social systems.

It accomplishes this through numerous mechanisms. Design thinking, with its core emphasis on broad stakeholder engagement, empathy and co-creation, taps into diverse perspectives to find higher-order solutions, by first, assembling a diverse team and then giving them a conversational framework to use to leverage differences. During these conversations across difference, design thinking avoids reaching for early, often mediocre,

compromises, seeking instead solutions that resolve unwanted trade-offs. The search for multiple possible solutions supports the emergence of ideas during the process, shaped by conversation among the players involved. Exploration of the problem during design's discovery builds engagement that leads to alignment around the nature of the problems that need to be addressed and that naturally deepens dissatisfaction with the status quo, motivating ownership and energy for implementation. Ethnography that identifies pain points and unmet needs helps develop empathy and builds change agents' resolve to make life better for those they serve. In the process, it works to shift the mindset of "experts" from one of evaluation (people aren't using the system correctly) to one of empathy. Building new networks accelerates innovation. The testing process allows decentralization while minimizing risk and improving hypothesis-testing skills. Prototyping requires that innovators flesh out salient details of any new idea in detail. Experiments involving external stakeholders further enhance the tangibility and vividness of the new future.

Convening Conversations for Change across Diverse Stakeholders

By bringing these elements together, design thinking helps innovators in complex social systems convene conversations that create a "virtuous cycle" that encourages change. We see numerous instances of this in our research. In each case, we observe the activities previously discussed as critical to navigating complexity and uncertainty: de-centralization of decision-making, brokering of information across diverse groups, mechanisms for the creation of shared perspectives, collective performance norms, and coordinated learning within cohesive teams.

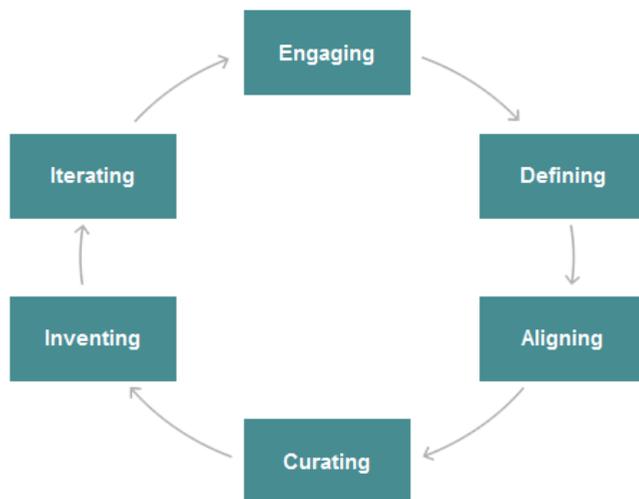


Figure 1 Catalysing Conversations for Change

First, organizations in our research base reached out from headquarters to *engage a diverse set of local stakeholders* in the conversation, inviting new perspectives from employees who often previously had little voice in the innovation conversation. At the US Department of Health and Human Services (HHS), for example, their Ignite Accelerator program is bypassing the hierarchy of the HHS bureaucracy and democratizing innovation

by inviting the 80,000 plus employees at the front lines of HHS throughout the country to tackle opportunities for innovation that they see in their own backyard, supporting their efforts with training and mentoring in design thinking and lean start-up, and building their creative confidence that they can succeed.

Next, the organizations in our research freed local teams to find their own generative problem space to work together in. One NGO, The Community Transportation Association of America (CTAA), focused on better meeting of the transportation needs of low wage earners, offers a case in point. At CTAA, we see the power of localized decision making that uses design thinking as a backbone to foster grassroots problem identification and solving to address the transportation difficulties faced by low-income workers. Rather than defining a major global problem centrally, and recommending implementation of broad transportation initiatives, the emphasis in CTAA's application of design thinking was on selecting and empowering a diverse set of local partners to frame problem statements and form solution concepts grounded in the unique set of circumstances within each of their communities. CTAA taught the design thinking methodology to seven community-based teams from across the US, allowing each community team to define its target customer group and develop a customized local program to respond to that group's challenge in getting to available jobs. CTAA's approach put the tools and power into the local community's hands and led to problem definitions that were both fine-tuned to local nuance and more easily adjusted as learning occurred.

Alignment emerged in our research case studies as team members transitioned from their own view of reality to a shared view. At the US Food and Drug Administration (FDA), for example, years of observing the polarizing effect of the traditional "public-meeting" format approach that involved each stakeholder presenting their preferred solution sequentially in a large forum, that generally devolved into an entrenched opposition to each other suggestions, led them to design thinking. The FDA elected to try a design thinking approach to reach an accord on standards for emergency respiratory therapy devices, which had a history of conflict. They convened the stakeholders involved which included respiratory device manufacturers and fellow federal agencies and put together small groups, each with a diverse stakeholder representation. They then led a dialogue, using collaborative design tools like affinity clustering, visualization, and joint prioritization. Not only did they develop a new set of solutions together, they discovered that they had been arguing about the wrong problem: achieving standards would accomplish little in reality - the core challenge to emergency preparedness lay with variation in the capabilities of users, not manufacturing standards.

Curation happened next, as the innovators drilled down to what really mattered and decided what to pay attention to. Deep immersion in stakeholders' worlds, rather than imposing experts' views, led to crucial insights in the organizations we studied. The medical staff at Monash Medical Centre brought together clinicians from across specialties and helped them align their differing views to achieve consensus on changes both small and large. After years of recognizing the need for change in their psychiatric walk-in department, but unable to reach consensus on how to respond, clinicians decided to try a design thinking approach and did the difficult work of learning more about patients' actual treatment experiences from the patient's perspective, rather than the Medical Centre's. What they learned changed the nature of the solutions they sought and allowed them to reach consensus on a new design. What was missing, they realized, was not attention to medical details, it was a sense of *care* for a patient's long-term problems that was being lost amid multiple points of clinical interaction. This new focus aligned the

perspectives of the multiple specialists around the patient's needs, rather than their own clinical perspectives, and allowed them to finally take action to improve the patient experience.

Finally, the innovators in our study iterated and experimented, using prototypes. Starting with a set of initial ideas, testing them, seeking feedback from outside stakeholders on ways to improve them (or, if needed, even discarding them) on the basis of their experimental results. This approach not only reduced the risk and cost of failure in a decentralized system, it created a vehicle for on-going brokering of information, the coordination of learning, and the development of cohesive groups that provided psychological safety in the face of change. As part of the process of experimentation, design thinking insists that we construct a clear and compelling case for an altered future as part of the process, not as an afterthought, and provides powerful tools, like prototyping, co-creation, and experimentation, to accomplish this. Another story from our research, MasAgro, illustrates this. MasAgro is a partnership between the Mexican government and agricultural groups that works with local farming communities to bridge the gap between farmers and research scientists and encourage the adoption of sustainable modern agricultural methods. But subsistence farmers' entire livelihoods can rely on each year's crop, and they are understandably loath to risk abandoning traditional tried-and-true methods for new ones, even ones aimed at raising their income. MasAgro uses respected community leaders and local hubs to create compelling prototypes and experiments that demonstrate results. They even plant rows of crops side by side - one side using traditional methods and the other side using the sustainable modern methods- so that farmers can see the difference, providing the ultimate proof through prototyping and with it psychological safety, making the promise of modern farming techniques tangible to risk-averse farmers.

Another outcome we observed in our research from this virtuous cycle was the increased likelihood and speed of implementation. Engaged and committed people seized the opportunity to act, while those operating from a sense of compliance hesitated. Aligned members of larger systems transcended workplace politics to work together to reduce the frictions that might have slowed them down. Curated conversations helped innovators prioritize and focus on specifying essential design criteria— what was truly important to stakeholders—and avoid being distracted by a deluge of largely irrelevant data. Such engagement, alignment, and curation led to better implementation, with less inertia, hesitation, internal politics, and confusion to slow innovation down.

Taken together, these design tools and approaches provide the kind of enabling social technology that fosters democratizing design and brings diverse local voices into the innovation conversation to identify and solve their own problems, while fostering sharing across units. In doing this, it addresses one of the key challenges in governance in complex social systems—the tension between centralization and decentralization. Design thinking can begin to let us get at the best of both worlds, providing much more than just better solutions- enabling new kinds of conversations capable of catalysing change across difference.

Table 1 Innovation Challenges and Prescriptions

Authors	Challenge	Prescription
Brown and Eisenhardt (1995)	Differing interpretive schemes	<ul style="list-style-type: none"> • Alignment thru concrete tasks • Iteration & testing
Carlile (2004)	3 Boundaries to <ul style="list-style-type: none"> • transfer • translate • transform 	<ul style="list-style-type: none"> • Common lexicon • Shared meaning • Common interests
Dougherty (1992)	Departmentalized thought worlds	<ul style="list-style-type: none"> • Avoid prescribed roles and pre-determined problem definition • Ground activities in particular, not abstract • Shared vision
Tsai & Ghoshal (1998)	Social capital	<ul style="list-style-type: none"> • Shared vision
Boland & Tenkasi (1995)	Communities of knowing	<ul style="list-style-type: none"> • Perspective talking (make thoughts visible) • Perspective making (surface & reconcile differences)
Edmundson (1990)	Psychological safety	<ul style="list-style-type: none"> • Tolerate & discuss error • Ask questions • Seek feedback • Experiment • Reflect
Tsoukas (2009)	Knowledge through social networks	<ul style="list-style-type: none"> • Dialogue • Emergence of joint frames • Incremental emergence
Majchrzak, Move & Faraj (2012)	Transcending difference in complexity	<ul style="list-style-type: none"> • Shift in emphasis • Shift to stakeholder criteria • Co-create visuals • Try them out with stakeholders • Let go of single solution
Norman & Stappers (2015)	Social systems complexity	<ul style="list-style-type: none"> • Co-creation • Shape cognition as well as behaviour • Simple rules • Provide safe environment
Uhl-Bien & Arena (2017)	Creating “adaptive” spaces	<ul style="list-style-type: none"> • Build connections

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