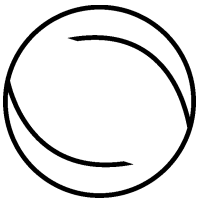

Introduction to the Special Issue Organization Studies as a Science for Design: Creating Collaborative Artifacts and Research

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Organization research has recently started to reach beyond the antagonisms of positivism versus its postmodernist and critical counterparts, which have dominated the discourse in organization studies over the last 20 years. A promising approach instead involves positioning organization studies as a *science for design*. While the natural sciences seek description, explanation or prediction of what is, design scientists ask what could be, seeking betterment of the human condition. Inspired by Simon's (1969) *The Sciences of the Artificial*, an organization science for design seriously addresses the need for scholars and managers alike for better organizational forms and processes. Organization design science is still very early in its development: different, even conflicting theories about organization design and development abound; laboratories for organizational experiments are largely absent; and little knowledge on management and organization is systematically codified — too much remains anecdotal and dependent on context. As a result, the current state of a science for organization design is fragmented and immature.

Previous academic research on organization design focussed primarily on questions of theoretical relevance. A science-for-design perspective differs from previous treatments of organization design in two ways. First, it can bridge the worlds of theoretical and practical significance. Without theory, organizational practice is uninformed; without practice, organization theory is moribund. Second, the enormous diversity in organization research and theory is merely confusing without an adequate epistemology, particularly in view of the need to connect to practice. A design science approach can facilitate an integrative framework that acknowledges the unique role and contribution of key epistemological traditions in organization studies (including positivism, constructivism and pragmatism).

The call for papers for this Special Issue invited submissions from scholars who view organization and management research as a pluralist discipline that draws on (at least) two key modes of engaging in research: science and design. According to Simon (1969), s*cience* views existing organizational systems as empirical objects from an outsider perspective, while *design* envisions systems that do not yet exist — either completely new systems or new states of existing systems. Science raises the question 'is this proposition valid or true?', while

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design asks 'will it work better?' Simon foresaw that a design science approach could help overcome the isolation of specialists by providing a common ground for bringing our diverse interests together in a search for more desirable states of (organizational) affairs.

This Special Issue is therefore dedicated to exploring the interface between organization science and design. As such, it extends and fundamentally differs from previous work, for example published in the special issue on organization design in *Organization Science* (Dunbar and Starbuck 2006) as well as the special issue on organization development in the *Journal of Applied Behavioral Science* (Bate 2007).

Foundation and Background

What kind of things *are* organizations? Our descriptions matter, for they direct our attention and expectations. Traditional organization theory has emphasized structure and control. Forty years later, close inspection 'reveals most organizations to be mere legal fictions with no "inside" or "outside" analogous to borders — they are simply dense spots in networks of contracts' (Davis and Marquis 2005). Some researchers now see organizations as protean social and enacted constructs (e.g. Bate et al. 2000; Weick 1979) in which structure, understanding and culture constantly co-evolve. Again others say organizations are action streams (e.g. Starbuck 2003) or action nets (Czarniawska 2004). But they agree that organizations are (much) more than structure.

Adopting a design perspective encourages attention to questions such as: If organizations are designed, by whom? For what purposes, and for whose purposes? Why should this be so, and why are some purposes and authors legitimated, while others are ignored? What approaches to design are more effective, resulting more often in beneficial designs (beneficial to whom?) and less often in unbearable costs (to be borne by whom)? From a design perspective, these questions parse the degrees of freedom, extend possibilities — and underline the temporary nature of any design. Today's world is profoundly organizational — contemporary human life in developed countries at least occurs overwhelmingly within (and often through) organizations. Yet much of our contemporary theory of organizations rests on research carried out a half-century ago or more, in a less pervasively organizational time. This would be less critical if we were not surrounded by so very many examples of failed organizations: cases of alleged fraud, corruption and corporate downfall (e.g. Bremer Vulkan in Germany, Enron in the US, and Suez in France), massive waste and profiteering (e.g. surrounding hurricane Katrina and the Iraq war), theft by employees (e.g. passengers' baggage pilfered by airline or airport security employees), and iatrogenic medical disasters. The failures encompass the entire range of organizations — both for-profit and not-for-profit, private and public; military, medical and educational; in manufacturing and service; and among local, national and international firms.

Beyond these failures, many practitioners seem indifferent to overwhelming evidence that certain practices simply do not work (Pfeffer and Sutton 2006). Possibly, instead of being indifferent, managers are confused and defensive

about what they do and the results reported around them, simply overwhelmed by a plethora of conflicting advice. Perhaps they pragmatically decide to ignore it all, including what others may see as hard evidence?

Herbert Simon (1969) offered a starting point, asserting that schools of architecture, business, education and medicine are all primarily concerned with the process of design. He also observed that natural science imitation had virtually erased design theory and practice from professional schools. As such, a science for design is the appropriate focus for professional (e.g. business) schools, and for organization scientists in particular.

Whereas Simon explored what design science might entail, distinct from imitating physics or chemistry, contemporary inquiry carries the inquiry towards more open, innovative responses to the challenges of creating meaning. For example, Warfield (1984) outlines the epistemological foundations of design science, drawing on Peirce and others. Sarasvathy (2003, 2004) describes a kind of entrepreneurial bricolage in finding a design path that works. Krippendorff (2006) argues that 'the semantic turn' in design thinking creates a space for explorations largely ignored by design researchers, drawing on a new vocabulary that points to the meanings of artifacts, interfaces, conceptual models of participants and stakeholders, and languaging: in a word, sensemaking. Krippendorff defines a science *for* design as

'a systematic collection of accounts of successful design practices, design methods, and their lessons, however abstract, codified, or theorized, whose continuous rearticulation and evaluation within the design community amounts to a self-reflective reproduction of the design profession. (...) Its aim is to keep design discourse viable and productive.' (Krippendorff 2006: 209)

Organizing and Designing: Design Discourse

Yet the very word 'organization' may itself be part of the problem, signaling a fictitious permanence, and emphasizing success. Design instead implies a dynamic process leading to impermanent outcomes, and iterative engagements with design*ing* and organiz*ing* that embrace ephemerality and constant improvement (Weick 1979; Yoo et al. 2006). This view of design invites questions about *who* is designing *what*, drawing on *which* kind of goals and criteria (if any), and in what context?

Many parties may be interested in such a conversation. Much organization design is redesign; the process may include prior designers as well as those who currently inhabit the artifact or will do so in the future. The design process relates multiple levels and types of functionality, including those of, say, employees, clients, and society at large. These propositions are already reflected in regulations that specify such matters as working hours and conditions, effluent and air pollution emissions, and required financial information. Formal organization design has previously considered only a fraction of these issues, focussing almost exclusively on internal rationality, work flows and efficiency: emphasizing organizations as economic engines while ignoring concomitant consequences and impacts (which, however, profoundly affect organizations' ability

and effectiveness to deliver economic results). Disciplines addressing these consequences, most notably organization development, action research and ethics, have generally occupied a peripheral and remedial role.

Van de Ven and Johnson (2006) examine the interplay of knowledge for theory and practice, extending a discussion that goes back for decades (as their references indicate). The rise of action research, organization development and critical management theories all speak to dissatisfaction with past theory-driven descriptive and explanatory approaches that leave out messy reality, the sort of imposed natural science model that Simon pointed to. Contemporary debate includes critiques of pragmatically irrelevant business school curricula as well as determinedly atheoretical, evidence-free management practices (e.g. Rousseau and McCarthy 2007).

Desiderata for a 'Science for Design'

Any science for design must embrace the idea that organizations are both 'natural facts' and 'socially created artifacts' — made things of a social and interactive type (cf. Rafaeli and Pratt 2006). As a result, organizational artifacts are recreated continually over the course of their existence, given meaning through interaction (Lave and Wenger 1991). Relegating organizational entities to 'natural fact' status narrows our focus on descriptive and explanatory properties, attaining false objectivity at the cost of impoverished theory. Instead, a science for design puts the interplay between organizational entities and phenomena as artifacts and as social facts at the center of organization studies. This idea is not new in our field: Argyris et al. (1985), Schein (1987) and Starbuck (2006) advocated clinical intervention on the grounds that one cannot understand a human system without trying to change it. Such intervention emphasizes the backstage realities that should inform research (Argyris et al. 1985; Schein 1987; Starbuck 2006), maintaining a creative tension between insider and outsider viewpoints (Lave and Wenger 1991).

Second, some aspects of design are discovered only in the path of action — we begin designing and creating, then discover in the interplay of ideas and constraints what can and cannot be achieved by what we start with, and adapt to create better designs that accomplish more of what we seek. Both internal organizational components (reactive, self-directed human components in particular) and external happenstance can affect efforts to design and create: The notion of components suggests parts adding up to a whole, and design may need to consider alternatives to that way of thinking about designing. Components often gain their meaning from the links and networks in which they are embedded. They are not 'parts' until they have a context (cf. Lave and Wenger 1991), and the meanings given arise from interaction (Giddens 1984; De Ronde 2003). Designing is about creating contexts and meanings that define components, as much as the other way around. Thus organizational entities are subject to the myriad of slippages, serendipities, interpretive variances and random events of any real-world undertaking involving human beings. Such slippages fundamentally imperil any theoretical architecture based on assumed (but fictional) stability. They also advocate for much *re*design.

Circumstances change and organizations must adapt to survive. So, too, effective organization research is necessarily adaptive, responsive 'on the fly' to the unpredictable events affecting real organizations, regardless of positivist illusions. Research is challenged to retain a keen sense of its own potential bias while simultaneously incorporating the *pathos* (emotion) and *techne* (practical knowledge) aspects of learning in organizations along with the *logos* (logical theory) and *ethos* (culturally appropriate action) noted by Van de Ven and Johnson (2006). Yet all of these, as socially encoded and interactively enacted meanings, also change.

An additional challenge follows from the character of organizational artifacts, as objects (i.e. what is being designed) that are also social constructions (the meanings created around these objects). Extending Krippendorff (2006), we can distinguish, for example, the following kinds of artifacts: *products* (as the end results of a manufacturing process); *structures* (signaling the sequence of authority levels and the distribution of task domains); *goods, services and identities* (as artifacts to be traded and sold); *management tools and systems*, that are created as instruments for accomplishing certain managerial intentions (e.g. MBO, TQM, BPR, 360 degrees feedback); *human–machine interfaces* (e.g. the artifacts that mediate between computers or airplanes and their users); *multi-user systems and networks*, which facilitate the coordination of many human activities across time and space (e.g. guiding people through information systems, check-in lines, or check-out and payment procedures); *projects and programs* (e.g. a new product development project or an employee empowerment program); and, finally, *discourses*, as semantic systems that evolve by being spoken and written (e.g. the narratives around a professional routine, role model, or ideology).

Each artifact in this list has its own jargon and thought world; the criteria for assessment are different for products (e.g. functionality and utility) than for organizational structures (e.g. transparency and accountability). In designing a discourse, criteria may involve generativity and rearticulability (Krippendorff 2006). Taking organizational 'discourse' broadly, the design task is to keep the conversation going, involve the interested parties to participate, collaboratively (re)make sense of experiences, in service of goals that also change.

Because organizational life is complex and fluid, multiple conceptions of artifacts tend to interact, conflict and converge. For example, a particular discourse may be supported by a project promoting the narratives central to that discourse (such as a trust-building program), but constrained and undermined by the way a particular management tool is used (such as limited sharing of information critical to performance). In general, any organizational entity arises in the meanings given to it (Krippendorff 2006). That is, the kind of artifact created in our minds and enacted in our behavior affects the process and outcomes of our efforts to create organizational entities. Employees who believe they are not trusted may well react in ways requiring further efforts to check, monitor and constrain their behavior — leading to deeper mistrust.

Another challenge involves avoiding the unintended dysfunctional consequences of efforts to organize and control: this challenge has two facets, one concerning implementation and one concerning research. Implementing

successful design of organization is necessarily messy, dynamic, iterative and responsive to circumstances, so any particular organizational arrangement is temporary, to be redone sooner or later as the undesired effects of our efforts are revealed, new needs arise, or better methods emerge. The research facet reflects this reality, in that organizations do not seem to permit us 'universal laws', unchanging unitary truths or deterministic descriptions. Organizational research 'truths' are suffused with context, interpretation, expectation, roles, temporality and relationships. In response, Romme (2003) advocates the development of design principles and propositions that are specific to certain conditions, contexts and objectives, while Weick (2005) points to iterative collaborative sensemaking as integral to organizing.

A further challenge concerns the genuine unpredictability of action and outcome both within the organization and beyond it. Internal understandings, interpretations and behaviors of proactive and reactive human participants in the artifact are, at best, only partially predictable. Externally, actors beyond the organization, as well as those within it, fundamentally shape the unpredictable future. Designing concerns crafting distinctions between the (temporarily) internal or external, responding to stimuli and new understandings, abandoning the internal/external distinction as clear-cut, self-evident or stable. Today's virtual organizations, strategic alliances, outsourcing and open innovation all point to ambiguous organizational boundaries and new interested parties.

Complexity theory notes that small differences in starting conditions may produce large, unpredictable consequences. This principle implies a certain futility to design: are (science for) design aspirations simply hubris? A design science approach steps away from potentially catastrophic illusions of omniscience by embracing another suggestion from complexity theory: a set of well-chosen simple (design) rules can shape a wide range of resilient and productive processes (Eisenhardt and Sull 2001). That is, rather than developing detailed recipes for supposedly permanent solutions, effective design points to a handful of simple rules and key processes, easy to vary and reconfigure. When organizing becomes increasingly complicated and dynamic, organization design should become simpler and easier to modify. Design thinking thus implies modesty and humility as well as hope for the future of organization studies as a science for design.

Much design effort involves redesign, redirection and self-organization — old news (e.g. Hedberg et al. 1976; Hedberg 1981), but we may need reminding. Without these kinds of capabilities, the danger is that designers may be part of the problem, too wedded to their design decisions, and too far from the task and its needs. In many organizational settings, (managers and consultants as) designers are the problem, not the answer. For example, operators in nuclear power plants have to use real-time logic to compensate for design flaws and make the designers' original intentions work (Perin 2006). Design may become dysfunctional where it gets divorced from pragmatics in ways that cannot be blamed solely on theory. Designing 'far from practice' can be dangerous; thus a design science perspective suggests marrying (re)design with experience, to facilitate design improvement.

These challenges point to an organization science focussing on dynamic design, intentionally involving and affecting participants' expectations, intentions,

interactions, and shared understandings. It aims to give rise to a (relatively) reliable stream of collaborative actions — not because those actions can be prescribed *a priori*, but because participants can reengage in collaborative sensemaking endeavors at need. This approach transcends structure, and especially any sense of permanent structure. Instead, it addresses unpredictable consequences by iterative redesign and constant attention to feedback, new perspectives and changing potential. Organization researchers also need means to embrace the diversity of internal perspectives available in any human organization, because otherwise any design will fall victim to the limits of its designers' original view. Above all, organization science as a design science engages with real-world interventions and results, not just abstractions from descriptive data. Unintended consequences and surprises will be on the agenda, as well as those expected consequences and emergent outcomes affected both by organizational action and by initial external conditions.

If organization science as design science is to be intellectually robust, pragmatic and cumulative, it must go well beyond the familiar structural aspects of organizations to include characteristics of human cognition and psychology, like the perceptual shortcuts that may limit attention to key details, the momentary confusion that might subvert an organization's effective relationship to its environment, as well as the myriad cognitive biases of human designers (Piattelli-Palmarini 1994; Weick 1993, 2004). In this respect, Bate and colleagues advocate design as a 'bare bones framework on which a more organic, emergent, social structure develops as people interact, argue, fall out, come together, and otherwise manage their day to day situation' (Bate et al. 2000: 199). Thus, 'updating and repeated sensemaking become a testimony to the soundness of the design, not an indictment of its flaws' (Weick 2004: 48). This view is highly consistent with Suchman's (2004) advice to decenter the manager and designer, lessening the emphasis on control and coordination to favor *in situ* configuration. These desiderata also argue powerfully for a much more active, engaged practice of organizational scholarship that pays more attention to knowledge that is both actionable and grounded in theory and evidence (Van de Ven and Johnson 2006; Romme 2003).

In Sum

The thrust of our argument can be summarized as follows: organization research as a design science must:

1 Go beyond the prevailing conception of organizational entities as facts, as natural phenomena; and therefore acknowledge that organizational entities need to be understood as human-made artifacts as well as natural facts; both perspectives are essential ingredients to organization research as a science for design;
2 Engage with the creative tension that arises from the previous point — to learn to understand organization and organizing from insider as well as outsider positions;

3 Acknowledge that artifacts are created in view of the meanings given to them; these meanings can be very diverse and ambiguous (e.g. products, management tools, networks, projects, discourses) and tend to interact and feed back on each other;
4 Avoid the unintended dysfunctional consequences of our efforts to (over)organize and control; first, this implies designing is necessarily messy, dynamic, iterative and responsive to circumstances; second, organizational artifacts can not be described in terms of universal or deterministic mechanisms; however, the design process can be guided by principles that are context-specific and infused with interpretations, expectations, roles and relationships that matter;
5 Acknowledge the genuine unpredictability of action and outcome, both inside and outside the organizational artifact;
6 Engage with complexity theory to overcome a potentially catastrophic image of omniscience and to go beyond design expertise as distinct from and superior to practice, towards collaborative inquiry engaging both 'researchers' and 'practitioners';
7 Embrace capabilities for redesign, redirection and self-organization; these capabilities somewhat reduce the danger that designers produce artifacts with flaws that cannot be repaired;
8 In sum, organization studies as a science for design implies a much more active, engaged practice of organizational scholarship that pays more attention to actionable knowledge grounded in theory and evidence.

Overview of Papers in this Special Issue

This section turns to the seven papers in this special issue. The first paper by Sarasvathy, Dew, Read and Wiltbank (2008) depicts organizations as artifacts on the interface between their inner environments and their outer environments. Drawing on studies of how entrepreneurs decide and engage in new ventures, the authors argue that organization design happens at two interfaces: first, at the interface between organizational founder(s) and the firm they design; and second, between the firm and the environment in which it operates. Sarasvathy and co-authors use recent developments in the study of entrepreneurial expertise to show why an *effectual* logic of design is necessary at the first interface, and what its consequences are for designing at the second. The key contribution of this paper involves the notion of effectuation in organizational design, which implies that entrepreneurs not only design organizations but also design the environments we live in.

Garud, Jain and Tuertscher (2008) explore how organization designs can benefit from *incompleteness* in contemporary environments characterized by continual change. To see how such designs work, they examine two cases — the Linux operating system and Wikipedia, the online encyclopedia. These cases

show how such designs make it possible for different actors to engage and contribute in the present, in anticipation of future options and based on an ever-expanding memory of outcomes. As the design literature tends to emphasize the virtues of completeness, Garud and co-authors contribute to this literature by understanding organizational artifacts as tentative works in progress, that are fuzzy, distributed and continually changing.

The paper by Michlewski (2008) empirically explores what constitutes *design attitude* displayed by professional designers in four design-led organizations (IDEO, Nissan Design, Philips Design and Wolff Olins). Using interview data, he distills five theoretical categories to characterize design attitude, focussed at its core on creating fundamental value through epistemically unconfined exploration. Thus the article by Michlewski exposes the fabric of designers' culture to suggest a promising avenue for further research, the cultural interpretations of design attitude in organizations.

The last four articles in this special issue share an interest in design principles or propositions. Denyer, Tranfield and Van Aken (2008) argue that, while organization studies is often criticized as fragmented and of limited relevance for practice, it nevertheless involves an impressive body of evidence. A design science approach emphasizing the development of solution-oriented or prescriptive knowledge would increase its relevance. Denyer and co-authors discuss the role of prescriptive knowledge cast in the form of design propositions, involving the combination of a certain context, a particular intervention type, designated generative mechanisms, and intended outcomes. They suggest a design-oriented research synthesis may address the fragmentation of scholarly knowledge to increase its chances of application, as high-reliability organizations illustrate. This article contributes to the discourse on design science by providing an elaborate methodology for developing design propositions through research synthesis.

Dougherty (2008) argues that the body of knowledge available in organization studies offers conflicting design ideas for organizing large firms in mature industries for sustained product innovation. These conflicts arise from the theoretical bifurcation between social constraint and social action. Designs based on social constraint emphasize boundaries, authority and reward mechanisms, while designs based on social action emphasize emergence, knowledgeable action and self-fulfillment. Dougherty's design science framework reveals the incommensurate principles in the bifurcated designs. She argues that so-called construction principles are imperative statements for action that bridge organization theory and organization design, and highlight deeper meanings behind design guidelines. Such principles for innovation evoke different patterns of managerial work, emphasizing either direct managerial agency while constraining employees, or indirect agency through shaping and enabling employees. The key contribution of Dougherty's study is that it bridges social constraint and social action in designing organizations for sustained innovation.

Hodgkinson and Healey (2008) advocate a pragmatic science of strategic intervention in scenario planning. Scenario planning is a field of practice where only limited research evidence is available that is directly relevant to the design problem at hand. Hodgkinson and Healey say researchers can address this

challenge by capitalizing on well-established bodies of basic theory and research in the wider social and organizational sciences that may suggest robust design options. In adopting this approach, Hodgkinson and Healey draw upon bodies of work in the field of personality and social psychology, namely social identity theory, self/social categorization theory and the 'five factor' model of personality, to distill a series of propositions to inform the design of scenario planning interventions, centered on team composition and the facilitation process. The main contribution of this study involves the advancement of a pragmatic science approach to the design of organizational artifacts in cases where direct evidence is limited, an approach that meets the twin imperatives of scientific rigor and organizational relevance.

Finally, Grandori and Furnari (2008) pursue the analogy with chemistry, aiming to reveal the inner composition of organizations and specify the laws to be respected when crafting them. They draw on a combinatory analysis and design methodology, grounded in both configurational and complementarity-based approaches, to specify a set of basic organizational elements and a set of combinatory laws regulating effective combinations. Testable propositions are derived on the necessary and sufficient conditions that the composition of organizations should respect in order to achieve high levels of efficiency and innovation. These propositions are tested empirically on a sample of firms, using an innovative application of Boolean algebra. As such, this study's main contribution is developing and illustrating a computational approach to testing design propositions with empirical data.

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