Knowledge of forms is the indispensable basis for the philosophers' craft of ruling the polis. Socrates

Abstract
An age-old issue is how inquiry and action can reciprocally contribute to transforming existing into preferred conditions. Leading scholars of a recent generation repeatedly addressed this general issue in human affairs. Herbert Simon’s major proposal was to develop design-oriented sciences or, equivalently, sciences of the artificial. In public management, the take-up of this proposal has been patchy. In this essay, we identify a recent attempt to construct foundations of a design-oriented science for public management, focusing on work by Eugene Bardach. In order to perceive its significance, we place Bardach’s design-oriented approach within the compass of Simon’s sciences of the artificial and catalogue the unfinished business that must be completed for Bardach’s design-oriented approach to achieve acceptance and reach.
MAKING PUBLIC MANAGEMENT A DESIGN-ORIENTED SCIENCE

The administrators of the UK’s Research Assessment Exercise have recently suggested that fields such as business and public administration should be required to report on how the research they do influences practice. In a similar vein, the leading business-school accrediting agency, the AACSB, issued a report in February 2008 recommending that schools be required to demonstrate the value of their faculties’ research by demonstrating its consequences in terms of practice improvements. We sympathize with the intent of these proposals, if not necessarily their content. We believe that public management research ought to be both rigorous and relevant.

Given this premise, how should public management research be designed, carried out and disseminated to achieve the twin goals of rigor and relevance? In organization studies, evidence-based management (EBM) has emerged as a leading candidate for closing the research/practice gap and, indeed, as a master narrative for the study, teaching, and practice of management (Rousseau 2006). This narrative goes more or less as follows.

Much managerial practice is, regrettably, guided by cosmopolitan fads. Some is informed by casual benchmarking. Much is based on arbitrary attitudes of powerful people. In all these respects, the practice of management is far from evidence-based – and also frequently faulty. Meanwhile, back on campus, many hundreds, even thousands of academic researchers are generating mountains of knowledge about the interplay of markets, organizational practices, and managerial action. Hence, there is a knowledge-practice gap. In closing this gap, the field of management should imitate more advanced professionalization projects, including, foremost, evidence-based medicine. In advancing evidence-based management, academics and practitioners should translate social science evidence into practices. Doing so requires, among other things, changing management education, so that students come to appreciate and scrutinize social science evidence about human behavior in organizations – and see its direct implications for principles of practice. Beyond this, communication barriers need to be overcome, using any number of techniques, so that managerial decision-making becomes less arbitrary, more reflective, and more effective.

While, we think students of public management would be ill advised to join the evidence-based management movement. This is not only because the research/practice gap is arguably smaller in public administration than in , but also because EBM’s proponents fundamentally misdiagnose the nature of the research/practice gap.

Moreover, EBM’s prescription is little more than a loose analogy to evidence-based medicine, although like many analogies, the analogy raises issues that are worth considering. Instead, we believe that it makes more sense to adopt a prescription, which deals directly with the management research/practice gap, if such an alternative can be found. Fortunately, students of public management have elaborated just such an alternative to EMB – design science – offering reasoned-based advice about how communities of researchers and educators should assist to contrive actions aimed at converting existing conditions into preferred conditions.

Our purpose in writing this essay is recalling and retrieving the design-science alternative. Doing so is doubly opportune, considering that the trope of New Public Management (Hood 1991) – which was immensely functional in crystallizing international, interdisciplinary research on public management – has become a less compelling concept after 20 years.²

² Most disciplinary social science research is like biology or physiology – it is concerned with how things work. Management is like medicine in that it is concerned with making things work better. The difficulty is that management academics, unlike medical researchers, are not practitioners. We don’t make things better. We give
The design science that we recall here was adumbrated by Herbert A. Simon in his *Sciences of the Artificial* (1996), which fleshed out a proposal for approaching the inter-defined tasks of design and problem solving. Simon described problem solving as designing assemblies of actions, including the development and utilization of artifacts or artifices, that would transform existing conditions into preferred conditions. The nub of Simon’s proposal was that research and pedagogy should provide intellectual control over the challenge of designing change mechanisms and artifacts. The production and teaching of this kind of knowing would help human agents (including practitioners) make the most of their cognitive capabilities when facing practical challenges. Such would be the purpose of a plurality of “design sciences” or, equivalently, “sciences of the artificial.” He assigned primary responsibility for cultivating these several design sciences to professional schools. According to Simon: “Design… is the core of all professional training; it is the principal mark that distinguishes the professions from the sciences. Schools of engineering, as well as schools of architecture, business, education, law, and medicine, are all centrally concerned with the process of design” (Simon 1996: 111).

Innumerable public management academics accept that research should focus on how organizational action can be contrived with the larger aim of converting existing into preferred conditions. For this reason, it might seem that Simon’s approach has been completely absorbed. We have come to think otherwise. In our view, Simon offered a specific vision of research practice: it is different from many public management writings, including those that dwell on how to convert existing conditions into preferred conditions. What remains distinctive about Simon’s approach is its concern with designing artifacts or artifices, along with assemblies of actions. According to Simon, designing is purposeful doing. Further, designing is typically a collective enterprise—a social process. Consequently, it comprehends the improvisation and enactment of artifacts. In public administration, studies concerned with artifacts—such as budgeting and accounting systems, balanced scorecards, or the institutional foundations of merit-based personnel systems—tend to focus exclusively on their codification, implementation and execution. Simon says we should be concerned with the design and design processes—and we should use systematic inquiry, drawing on multiple fields of contemplative knowledge, to bring the “search” or “design” process under advice. So how do we make the advice we give helpful? Arguably, there are two research paths that will allow us to give more helpful advice. Both require us to understand better what it is that public managers do and how. Consequently, both look a lot like reverse engineering, both require a lot of creative extrapolation, and both require us to get out more. First, we can look for intellectual artifacts in other practical disciplines that have been found useful and show how they would work in government. This is the main thrust of NPM—ransacking the business disciplines to find useful artifacts that can be applied in government. The problem with this approach is that the most useful artifacts found in the business disciplines are from financial economics and accounting and managerial control. One reason for the academic disenchantment with NPM is that these disciplines address concerns that are relatively unimportant to students of public management. Second, we can look for intellectual artifacts in practice. Careful extrapolation from practice would help our students and reflective practitioners to make sense of the situations they face, to understand how events shape conditions, and individual and collective actions influence outcomes. That is, of course, the thrust of this essay.

3 This concern has been taken up in the sociology of economic life, especially among European scholars interested in the process dynamics of technological innovation such as Bruno Latour (2005), who discusses ‘assemblages’ of nature and the process of assembling under the rubric of Actor Network Theory. The same concern is highly apparent in studies of information systems design and utilization (Orlikowski and Barley 2001, Kallinikos 2002, Brewer, Neubauer, Geiselhart 2006.). Our concerns are similar. However, their focus is on process dynamics of technological innovation, ours the process dynamics of designing organizational artifacts and managerial actions.

4 For an interesting exception to this generalization, see Forrester and Adams (1997).
intellectual control. In public management, despite increasing attention to innovation and leadership, we have not yet managed to do what Simon says.\(^5\)

Yet, if public management is not a science of design, at least not one that is adequately concerned with contriving social action,\(^6\) Eugene Bardach, a stalwart of Berkeley’s School of Public Policy and a recent president of the Association of Public Policy and Management (APPAM) has done much of the spadework needed to retrieve the design-science alternative for our field and our time. Bardach is best known for espousing “smart practices analysis,” a concept put forward in his 1998 book *Getting Agencies to Work Together: The Practice and Theory of Managerial Craftsmanship*. Smart practices analysis, considered as a method, is a way to use theory and evidence to analyze repetitive patterns of social action (such as interagency collaboration): the immediate objective is to discern the dynamic structure of such practices and explain their performance characteristics. In his 2003 APPAM presidential address Bardach (2004) exhorted analysts to do a better job in learning from second-hand experience. When investigating cases whose performance characteristics are outstanding, the analyst should not be content with describing surface-level practice features. Rather, the analyst should assume that performance is attributable to social processes in which practice features play a contingent and instrumental role. Against this background, a smart (or ingenious) practice is characterized by the mechanisms that represent causal links among the practice’s (contingent) features, interdependent action, and performance characteristics. The focus on learning and social mechanisms rather than contingent features suggests that smart practice analysis is a novel, more intellectually controlled approach to the study of (innovative) practices. Taken as a whole, these recent writings contain compelling responses to critiques of so-called best practice research in public management (Lynn 1994, 1996, Bardach 1994, 1998).

Bardach’s recent work is gaining attention. For instance, it is a theme of a recent special issue of *Governance* on smart practices and innovation. One article in that special issue (Barzelay, 2007) recapitulates the most fundamental ideas of what he calls extrapolation-oriented research (akin to smart practices analysis) and extrapolation-based design (an aspect of managerial craftsmanship). In addition, Barzelay shows how case-oriented methodological practices can be explicitly adapted to the aims and challenges of extrapolation-oriented research, illustrating the point with some of his own empirical work.

The present essay, by contrast, situates Bardach’s recent writings in relation to the fundamental questions mentioned at the outset. In this context, we see Bardach’s extrapolation-centered approach as an unmistakable attempt to realize Simon’s idea of a design-oriented science within public management. Moreover, Bardach’s work has taken steps to overcome the limitations of Simon’s own version, which stopped shy of considering...

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\(^5\) Lynn (1996) made a similar general point in calling for reconciliation between public administration and public management in the U.S. However, he did not seek to revive the specific idea of a science of the artificial as a proposal for the field’s self-directed evolution.

\(^6\) Almost no one in public management has sought to revive Simon’s proposal in as many words. Exceptions include Chisholm (1995) and Meier and Keiser (1996). However, the research approaches they outline in the name of the science of the artificial bears scant resemblance to the ideas Simon put forward. Lawrence B. Mohr formulated an early, quite sophisticated effort along these lines (1982, 1969). Indeed, Mohr adumbrated many of the ideas about subject and method raised here, including a discussion of variable oriented and case oriented positive research. Something similar could be said about Bob Behn (1996) or Charles Hoch (2006). A parallel revival along similar lines appears to be underway in organization science and management (Romme 2003, see also the March 2008 issue of *Organization Studies*, especially Jelinek, Romme, & Boland 2008 and Sarasvathy, Dew, Read, & Wiltbank 2008); one that strikes us as reasonably faithful to Simon’s vision.
the general issue of how to contrive high performing social action. All in all, by considering Bardach’s proposal, academics in the public management field can gain new perspectives on their collective intellectual enterprise and may well come to introduce similar variations into their own research and pedagogical activities.

Our essay is structured as follows. Section 1 retrieves the idea of a design-oriented science by recapitulating the relevant arguments of Sciences of the Artificial. Section 2 portrays Bardach’s recent work as calling for a design-oriented science of public management. Section 3 identifies unfinished business that must be completed for the Simon-Bardach design-oriented approach to achieve current acceptance and reach.

Recalling Simon

The term sciences of the artificial sounds strange when first encountered. It serves as an umbrella term for numerous more familiar practically-oriented intellectual enterprises, such as engineering design, architecture, artificial intelligence, and management science. Simon wished to argue that these diverse intellectual enterprises shared purposes and means. The purpose was to solve problems, i.e. convert existing conditions into preferred ones. A solution, for Simon, was an analytical description of processes through which intentions for achieving preferred conditions would become realized. Simon’s focus was on how human agents design such solutions. For him, solutions were not so much chosen as constructed through a reciprocal process of thinking and related forms of activity, which he sometimes described as search, improvisation, or even tinkering. The search or, equivalently, the design process was what Simon thought should be brought under greater intellectual control. In his own words:

Everyone designs who devises courses of action aimed at changing existing situations into preferred ones. The intellectual activity that produces material artifacts is no different fundamentally from the one that prescribes remedies for a sick patient or the one that devises a new sales plan for a company or a social welfare policy for a state (page 111). We as designers, or as designers of design processes, have to be explicit as never before about what is involved in creating a design and what takes place while the creation is going on (page 137).

For Simon, the means for problem solving involves designing “artificial things” (or artifacts in this sense). Through design, artifacts are contrived with a view to performing a function or fulfilling a purpose. Whether (and how well) a function is performed or purpose fulfilled depends on the interplay between the artifact and its environment. For some artifacts, like spacecraft, the key properties of the environment are aspects of physical nature. For other artifacts, like information technology and accounting systems, the key properties of the environment are human or social. Thus, “fulfillment of purpose or adaptation to a goal involves a relation among three terms: the purpose or goal, the character of the artifact, and the environment in which the artifact performs” (Simon 1996: 5). According to this logic, any designer needs to consider both the function to be performed and the environment where the

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7 Simon’s analytics in The Sciences of the Artificial differ from those of his more familiar work on organizations, primarily because his intentions were more exhortatory and less explanatory. The micro- or individual-level foundations of collective action and behavioral plausibility remain. But instead of what, decisions and structures, his subject here is how to, designing and processes. This is, perhaps, a fiddly distinction. Even Simon tends to disregard it when his argument turns to organizational design. But it is for our purposes a very important one.
artifact would be situated (e.g. conditions or process of utilization) before reaching conclusions about what features to build in.

For Simon, the search process sensibly includes examining how a similar design challenge has already been met in other physical or social sites. To quote, “One way to solve a complex problem is to reduce it to a problem previously solved” (Simon 1996: 213). Studying the history of design efforts and resulting artifacts can provide insight into how to meet a current challenge, but Simon particularly recommended bringing scientific knowledge to bear in studying how and why existing artifacts have functioned under varying environmental conditions. Such intellectually controlled understanding of how artifacts fulfilled functions (or didn’t), in his view, would be a very helpful input to the search for solutions to the current problems facing a designer.

Simon also argued that design science constitutes an important narrative for pedagogical practice as well as research. Indeed, Simon asserted “professional schools can reassume their professional responsibilities just to the degree that they discover and teach a science of design, a body of intellectually tough, analytic, partly formalizable, partly empirical, teachable doctrine about the design process” (Simon 1996: 113). In Sciences of the Artificial, Simon did not dwell on any field of action. Public administration, for instance, garnered a single footnote. But his strictures on professional education map directly to our field. According to Simon, the trade schools of the past and contemporary schools, which all to often abdicate “responsibility for training in the core professional skill,” were both unsatisfactory. “Schools of applied science may well be better than trade schools,” but what we need are schools that can “educate for professional design at an intellectual level appropriate to a university” (Simon 1996: 112).

Finally, Simon included a chapter on the topic of social reform, where he made the unexceptional claim that organizations are the artifices we design and use to transform existing into preferred conditions on a large scale. But, what is organizational design? Simon said it was factoring and assigning problems to parts of an organization so that the organization’s interface with its task environment operates in such a way as to satisfy the aspirations of the organization. In other words, where he talked about the design of the policy enterprise at all, he relapsed into the language of choice and organizational structure, rather than that of construction and processes, which he highlighted elsewhere. Thus, one has to engage in “translation” work in order to explore what it would mean for public management to be a science of the artificial or, equivalently, a science of design.

**Placing Bardach on Simon’s Shoulders**

There are numerous ways to translate Simon’s ideas into public management research and pedagogy. Here we wish to show how Bardach has pursued Simon’s approach within public management and also where Bardach has traveled further down the same road.

Like Simon, Bardach espouses the idea that public managers should not simply replicate or adopt models of good practice, but rather should contrive means (practices) that would be adjusted to both the ends (functions) and prospective operating conditions or environment

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8 See note 1.
9 “If around the turn of the century we wanted to instruct a workman to make an automobile, perhaps the simplest way would have been to tell him how to modify a wagon by removing the singletree and adding a motor and transmission.”
Moreover, like Simon, Bardach is concerned with artifacts, mechanisms, and assemblies.

What is an artifact and what does it mean to have a conceptual explanation of how they are used and how they work? Further, how are artifacts different from mechanisms? A hammer is an artifact – a material artifact. How does it work? In response to these questions, Bardach asks us to consider the hammer: one could say that hammers are used to drive nails into pieces of wood to hold them together, and that they do this by being brought down swiftly and repeatedly on the head of a nail, forcing the nail into the wood. As he explains, this is a descriptive explanation. It is quite sufficient for a carpenter’s needs. But one might want to go deeper and ask how such repeated motions accomplish the given purpose. Now, one could talk about nails being wedges that hold pieces of wood together by friction, the hammer’s handle is a lever and its head is a driver. Wedges, drivers, levers, and friction are mechanisms. Indeed, he argues, it would probably be useful to go even deeper and talk about “how levers work” and about force and how it is amplified, about how potential energy is translated into kinetic energy, and about how levers are force multipliers. He describes this as the ontological level of explanation and adds that one can go a level deeper still, to say something about human purpose, explaining that humans are always looking for force multipliers, and that levers are just part of a class of tools that furnish mechanical advantage. Of course, this kind of conceptual explanation can be very helpful to the design of similar artifacts for other purposes (e.g., a stapler), or better artifacts for the same purpose (e.g., a nail gun), and, as design sophistication increases is, perhaps, necessary to those ends.

Public management is not carpentry. It is concerned primarily with relational artifacts and social mechanisms, although resources and material artifacts are also important to making collectivities productive. Piecework compensation is a relational artifact, for example, so too are management control systems. Incentives are social mechanisms, so are arbitrage, negative feedback, evolutionary selection, deviance-suppression, and bandwagoning (flocking). Bardach further argues that the design idea is powerful because it brings things together that “need to be present together” (Bardach 1998: 321). The central idea here is that assemblies of artifacts and mechanisms work differently from simple artifacts and mechanisms. For instance, “incentives” are simple “mechanisms,” but “management control systems” are assemblies. Moreover, assemblies of artifacts and mechanisms can be made to yield characteristic consequences – producing high value when they work well. And of course, backfiring or failing when they work badly. High-performance work results from the collective improvisation of assemblies of artifacts and mechanisms that fit together and reinforce each other’s effects to produce exceptional results. Against this background, Bardach (1998) notes that a smart (or ingenious) practice is characterized by mechanisms that represent causal links among a practice’s (contingent) features, interdependent action, and performance characteristics. He argues that one reason that process is such an appealing practice idea is that it is always an assembly, and an assembly in motion too. If we are really going to make progress understanding effective collective action, these more complex building blocks are the most important story.

In other words, Bardach attributes a practice’s performance characteristics to whether and how social mechanisms are activated or suppressed within any particular episode in which the same practice operates. Practice features, operating context, and participation by actors

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10 This notion is similar to complementarity in economics. However, it goes beyond it in the sense that complementarity still implies linear, additive causation, whereas an assembly implies multiple conjunctural causation (Ragin 1987).
play the role of activating or suppressing such mechanisms. Consequently, we see Bardach as explicitly advocating narrative positivism and event causation (Elster 1998, Kiser 1996, Abbott 2001, Abell 2004) as the methodological and the theoretical basis for extrapolation-oriented design and thus as an intellectual strategy for making empirical and analytical contributions to a design-oriented science for public management. One way, perhaps the only way, the researcher can link explanations to the thing explained is via a sequential or narrative explanation, albeit one that is layered with theories of social processes, known to micro-sociologists and others as social mechanisms. Social mechanisms are theories of processes, in which major ontological categories are conditions, beliefs, actions, and contexts (Hedström and Swedberg 1998, McAdam, Tarrow, and Tilly 2001, Mayntz 2004). Examples of social mechanisms are escalation processes, commitment dynamics, performance feedback, bandwagoning, herding, actor certification, and the normalization of deviance.

Hence, as a design science, public management research should actually offer practitioners intellectually controlled accounts of the means (including artifacts, mechanisms, assemblies, processes) by which analogous ends have been pursued. Such accounts would lay bare how the design features of a practice (artifact, mechanism, assembly, or process) have interacted with its human and physical environments to shape organizational action and performance effects. Learning from experience in an intellectually controlled way would be one step towards contriving “things and actions” that would promise to make programs and projects work.

Bardach emphasizes that the design process does not end with marshalling knowledge and heuristics for employing. His problem-solving approach to design also involves a description and diagnosis of the target site. In turn, dealing with operating circumstances and the localized specificity of desired preferred conditions necessarily evokes dissonance with codified activities or procedures, which calls for a dose of ingenuity to adapt practices to the context at hand. Hence, design is a creative process as well. In Aristotelian terms, the process involves at least as much wisdom as craft and probably more of the former than the latter.

Let us now show how Bardach rests on Simon’s broad intellectual shoulders. Both Simon and Bardach see the aims of intelligent action as transforming existing into preferred conditions. Practice is not just making wise choices appropriate the situation, but also involves contriving social and technical practices whose ends and means are instrumentally adjusted. Simon and Bardach agree that the design process can be subjected to intellectual control. Both Bardach and Simon also see a specific role for theories of processes. One reason is that theories of processes are ways of making complex social phenomena understandable. Another reason is that solutions themselves are typically process descriptions. According to Simon, “The activity called human problem solving is basically a form of means-ends analysis that aims at discovering a process description of the path that leads to a desired goal.” Theories of processes are descriptive propositions about contrived solutions to problems. As such, they are implicated in the account of how contrived solutions – assemblies of things and actions – are supposed to function or, equivalently, work. Finally, both look to social sciences for theories of processes. Both admire formalized theories of processes that have been developed in such disciplines as sociology, psychology, and economics and configured into scholarly traditions in such areas as organization science and policy studies. Both can be said to view

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the concept of a social mechanism as a theory of a process involving the interplay of belief and action in time (Hedström and Swedberg 1998, Elster 1998).

Turning now to differences: Simon repeatedly asserted that understanding “purposeful doing” requires researchers to move in an activity-theoretic, event-centric direction. As he observed, problems that have to do with actions should be attacked with flow charts, algorithms (Simon, 1995: 113) and alternative scenarios (148). Moreover, he usually respected the interface between applied science and design practice. Nevertheless, the first success of Simon’s distinguished academic career lay in building an empirically grounded theory of human and organizational decision-making. In some respects, Simon’s thinking about design could never quite shake off that success or his primary allegiance to quantitative, structural models. “When we study the process of design, we discover that design is problem-solving. If you have a basic theory of problem-solving then you are well on your way to a theory of design” (Simon, 1995: 122). We don’t deny that design is a form of problem solving, let alone that complex behavior can often be explained with a set of simple decision rules involving “satisficing,” “rules of thumb,” and attention-directing heuristics, that can be studied by computer simulation, laboratory experiments, or empirical analysis. Simon is even correct when he states that “adaptive systems have properties that make them particularly susceptible to simulation via simplified models” (Simon, 1995: 16) or that “dynamic laws, expressed in the form of systems of differential or difference equations, have in a large number of cases provided the clue for the simple description of the complex” (Simon, 1995: 215; Dothan and Thompson, 2009). But, explaining what happened is not the same thing as understanding how to make something happen. Not surprisingly, Simon’s failure to adhere to his own advice about research practice is most in evidence in his comments on organizational design, where he simply reiterates conclusions reached in his earlier work on organizations and administrative behavior (March and Simon, 1958).

In contrast, Bardach recognizes that a creative process of *bricolage*\(^{12}\) is required to improvise design options, which must then be imaginatively partitioned to create meaningful opportunities for choice. Like Simon, Bardach believes this search process involves borrowing, learning, tinkering, and experimenting. But Bardach is explicitly concerned with the construction of social interaction, a topic that was of relatively little concern to Simon. Bardach takes the design context as constructible, albeit constrained by the means available and individual commitments, and design goals as something to be negotiated, where participants in the design process are presumed to be both persuasive and persuadable to varying degrees. Bardach insists that understanding and shaping the social interactions of a design process are essential parts of the design process. Further, like Simon, Bardach accepts that humans aren’t naturally good decision makers, but unlike Simon he believes we are pretty good natural designers.

Finally, where Bardach’ strengths are most in evidence in his comments on social complexity, Simon has no peer when it comes to understanding computational complexity. This is evident both in his concern with factoring problems and with temporal decomposition. For example, Simon argues that design practice should comprehend target states for various time horizons and that this is conceivable because we need to know only enough to guide our current actions (Simon, 1995: 148). But, because our actions will establish initial conditions for our successors, we should try to leave them with as many options as possible, avoid commitments they cannot undo, and increase their knowledge and capacity for learning

\(^{12}\) See Freeman (2007).
(Simon, 1995: 163). At the same time, Simon provides no detailed discussion of everyday organizational action within the frame of sciences of the artificial. By contrast, Bardach explores sources and effects of intelligent effort (call it “human agency”) on the part of managers, front-line employees, and citizen co-producers situated within unfolding undertakings. Bardach’s recent work is unlike the Simon of the *Sciences of the Artificial* in being centrally concerned with how to contrive everyday organizational action, taking organizational culture, architecture, and even routines as givens. Thus, Bardach – more than Simon – seeks a science of the artificial for what might be called everyday practice in public management.

**How Bardach Stands Out from the Crowd**

To answer this question it may be useful to digress somewhat and contrast the idea of a science of design with organizational design in economics and management studies. Some economists design artifacts; organization theorists describe them and explain why they have been designed the way they are. Neither have much to say about the design process itself. This may seem a fine distinction, but it is nevertheless crucial. A science of design stresses social mechanisms of creating, learning, and enacting; the study of organizational design in economics and management studies stresses causal mechanisms, the configuration of design elements and contingency.

For example, the organizational design question from an economics perspective focuses on information costs, design elements – authority (decision/property rights), responsibility (targets), accounts (rules for measuring performance in terms of targets), and payoffs (specified algorithms for allocating payoffs contingent upon measured performance) – and their complementarity (Myerson 1983; McAfee 1993; Bergemann & Välimäki 2002), rather than the design process. Nevertheless, it must be acknowledged that economists have successfully recombined these elements to design artifacts that work. For example, they have employed Vickery-Grove-Ledyard type demand revelation mechanisms to design auctions and asset sales (Roth 2002; Whitford 2007), forward and futures exchanges (Shiller 2003), and quasi-regulatory institutions (Wilson 2002). Teaming up with their colleagues from the management disciplines, economists have also designed a variety of matching algorithms to deal with the missing or incomplete markets problem (Roth 2002; Abdulkadiroglu & Sonmez 2003).

In contrast it is hard to find equally successful improvisations from organizational theorists. Most of their work is descriptive or explanatory (see, for examples, Mintzberg 1983; Adler 1995; Grandori 1995 & 1997). What organization theorists could contribute to closing the gap between classifying artifacts and contriving them is careful description of the search process. As Armand Hatchuel (2005: 38) explains, research showing that good coordination increases team performance may not help us design artifacts that improve coordination. At a minimum, operational explanations of ‘coordination,’ ‘performance,’ and ‘team’ are required to give the statement practical meaning. “This is obvious in all scientific fields. For instance, in Medicine, the efficiency of a remedy means that some parts of the proof methodology (how the medicine has been absorbed, in which quantity, when, to whom and so one) will be

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13 Bardach has no aversion to using formal theories of processes (on the contrary he uses them), whereas this method of attaining intellectual control over complex social phenomena is not commonly employed in the sense-making literature, especially in the strands most influenced by the humanities.
14 Mechanism design in general, in the spirit laid out in Hurwicz (1973) has become a recognized subject in the theoretical literature, and even boasts a specialized journal, the *Review of Economic Design*.
prescribed to other physicians in order to obtain the curing impact. Further, actionability also depends on the background (and the capacities, including instruments) of the people informed of the research method and making their own sense of it.” In other words, relevance is contextual: one context is the knowledge production or creative enterprise; the other involves its reception. What is lacking in design theories in economics and most design theories in organization studies is a concern with how good designs are improvised and enacted. Some organization theorists get it; many do not.

Perhaps, because Bardach deals with familiar, common things and concrete situations and because his research efforts look like what many students of public management have been doing all along (e.g., Mashaw 1983; Barzelay 1992; Moore 1995; Bryson 2004), it is easy to overlook the radicalism of his perspective and the sweeping challenge it poses to ordinary management science.

**Doing Extrapolation-Oriented Research for Extrapolation-Based Design**

How should we do extrapolation-oriented research? Barzelay (2007) offers one answer to this question in a special issue of *Governance*, edited by Colin Campbell, on Smart Practices and Innovation in Public Management. The article picks up where Bardach’s 2003 APPAM President Address left off, by introducing the distinction between extrapolation-oriented research and extrapolation-based design. The article considers how to conduct extrapolation-oriented research about organizational action.

Barzelay argues that extrapolation-oriented research begins with a carefully described account of a functioning program or organization. An intellectually controlled account of a practice instance would reveal its underlying structure and explain the qualities of the practice’s functioning, or its performance characteristics. The data categories that explain those qualities include design features, operating context, and acts of participation.

The word “case” suggests a relationship between a particular phenomenon and a type of phenomena (Platt 1992). When studying temporal phenomena, the particular is a slice of history or an “episode” (for instance, political events in France in 1789) and the type is a process (for instance, revolutions). Given this frame, what occurs during episodes is organizational action. The focus on artifacts and their functioning directs attention to what might be called organizational practices. Within episodes, organizational practices are initiated, developed, operated, and decay. The change and operation of organizational practices during episodes are therefore focuses of descriptive and explanatory attention.

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15 For example, it a commonplace of the innovation literature that organizations that are good at execution are rarely good at designing operations and products. On the other hand, organizations that are good at designing operations and products nevertheless often have superior performance characteristics. These organizations are typically characterized by a culture of continuous improvement and widespread involvement in design activities (Leonard-Barton 1995). However, what we really like to know is how to get from a focus on episodic initiatives to a culture of continuous improvement or from one in which designing is an executive function to one in which everyone in the organization participates, how continuous improvement works and what the participants do, and how these social mechanisms are activated or suppressed.

16 Interestingly, organization theorists have done useful work on the improvisation and take up of artifacts designed by economists. In the option-pricing case, for example, Mackenzie describes the process in which the artifact designers purposefully and collaboratively set out to find the solution to a specific problem confronting financial practitioners – “the key mathematical work was not rule-following but bricolage, creative tinkering… it was, however, bricolage guided by the goal of finding a solution to the problem” (2003: 831).

17 See Appendices 1 and 2.
When the focus is placed upon the operation of practices, it makes sense to talk about “performance characteristics:” that is, “how does it work?” When the focus is placed upon change in practices, the analogous vocabulary might be capabilities or capacity: that is, “how did they do it?”

More specifically, Barzelay considers how to translate widely disseminated ideas about the design of instrumental case studies into specific guidance for this research program. It seems fitting to summarize the main points briefly here. The Barzelay article provides a narrative history of an episode where the “management system” for a government-wide program of presidential priority projects – known as Brazil in Action – started-up and operated. The context is the Federal Government of Brazil in 1996-8. The Simon-Bardach approach is utilized to explain the operation (i.e. the performance characteristics) of the management system (i.e. the practice). A principal explanatory issue is why the Ministry of Planning was able to participate effectively in the management system’s operation, despite having slight bureaucratic authority over the ministries and state owned enterprises that were in direct charge of the priority projects. A related issue is why the scheme’s “project managers,” whose formal bureaucratic authority within their respective organizations was slight, were nonetheless able to play their designated roles within the management system.

Barzelay’s explanation is narrative in character, in that it presupposes “multiple conjunctural causation” (Ragin 1987): it looks for connections among factors within the episode, rather than seeking to identify the separate effects of individual factors. The categories of explanatory factors include process design features and process context. The process design features included formalized roles, media for information flows, publicized launch events, ear-marked budgets for priority projects, amended budget execution procedures, and routine presidential review of progress reports. The process context included the public policy agenda of the President, the “political stream” (Kingdon 1984), and the landscape of policy subsystems crisscrossing the Federal government. The analysis of the functioning of the management system during the episode involved the concept of social mechanisms. In particular, the article considered how the activation of such social mechanisms as actor-certification (McAdam, Tarrow, and Tilly 2001) and performance feedback (Greve 2003) by the interplay of design features and context accounts for the effective participation of the Ministry of Planning and the project managers during Brazil in Action.

Viewed as extrapolation-oriented research the analytical process Barzelay proposes looks something like Figure 1. Figure 1 indicates: “Operating contexts” present occasions for making use of (designed) processes. The process may or may not be particularly well suited to the context. The context also has an impact on what kinds of participation are possible. The process and “acts of participation” interact with each other and together trigger particular “social mechanisms.” The social mechanisms produce “performance characteristics” that can be attributed to the process.

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18 We take both points as direct implications of Bardach (1998).
19 The rest of this section was suggested by John Bryson’s notes on an earlier draft (November 10, 2007).
Moreover, cases are not homogeneous; and there are no “net effects” across cases. There are no “factors” or “variables” that are presumed to be common to all cases with only the specific amount present marking the differences between them. Instead, there are concatenations of context, processes (assemblies), acts of participation, and social mechanisms producing outcomes in specific, presumably heterogeneous cases.

Consequently, generalizations, if they are to be made, are much harder to earn or come by than in quantitative, hypothesis driven research. This means that, by itself, extrapolation-oriented research does not establish any imperatives. However, a real-world actor can utilize such research, together with other considerations, including role frames (Schön 1983, Wenger 1998), in extrapolation-based design. The fundamental guiding heuristic of this practical activity is to contrive features that would tend to activate the same sorts of constructive mechanisms in the target situation as have been held responsible for the attractive performance qualities of outstanding instances of practice. The obvious corollary of this fundamental heuristic of extrapolation-based design is to contrive process design features that – in combination with actor participation and operating context – would tend to suppress those mechanisms whose effects would otherwise undermine a practice’s performance. (Examples of heuristic arguments drawn from the Brazil in Action case are outlined in Appendix 2). Translating heuristic arguments into a design for a public enterprise requires ingenuity and resourcefulness, qualities of practical activity that arise from tacit understandings and motivations.

This implies that extrapolation-based design is both harder and easier than extrapolation-oriented research. Harder, because the researcher is outside looking in; easier because they aren’t actually designing a public enterprise. The extrapolation-based design process is depicted in Figure 2. In this diagram, it is the mutual influence or “conjunctural causation” of context, assemblies, acts of participation, and social mechanisms that accounts for performance. Figure 1 a causal model, albeit one which reflects narrative positivism and event causation, while in Figure 2 no actor is “just sitting there,” but is actually “doing something.”

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**Figure 1: Extrapolation-Oriented Research**
Unfinished Business

In this essay our main conclusion has to do with the content of the field: we have argued that students of public management should straddle and link the social science-design interface, focusing on contrived organizational practices, primarily those involving relational coordination (see Gittel 2002). Instrumental concerns, especially the question of what can be done to change existing into preferred conditions, have always shaped the content of public management as a field of academic contemplation and study. For the most part, the contested issue is not whether social scientists should aim to deliver usable knowledge, but how to link inquiry to action and practice to theory. Our answer goes to the methodology of the field, as well as its content, to its warrants and not merely its aims.

Again, Bardach implies that it is nearly impossible to separate the ‘what to study question’ from the ‘how to study question.’ Much of what remains to be done to deepen and integrate findings arising from the study of collective action goes to these methodological issues. For example, Bardach’s descriptive and analytical accounts, especially his remarks on the management of voluntary cooperation, largely convince his audiences; but his claims about the purpose and science of field studies, especially the holding that the relationship between content and method is inherently reciprocal, do not equally resonate within the field.

Where students of public administration/management have given some thought to the question of advancing practice-oriented scholarship, solving the operational question of how to do field studies in an extrapolation-oriented way (Barzelay 2007) and scaling up the efforts to explore the social science-design interface would, we believe, go a long way toward producing a positive ideational response to the design-science approach. While this is contested terrain, involving perspectives deriving from three types of intellectual inquiry: humanities, social science, and design, we believe that the mechanisms of social proof, information cascades, and herding can be successfully activated in this portion of the public management community on behalf of a design-science approach. What we must do is show that accounts of practice that are intellectually controlled and meant to afford extrapolation-based design make better use of second-hand experience as a learning strategy than those that
are not. As they say, the proof of the pudding is in the eating. This ought to be our first priority.

Consequently, as proponents of this approach we must think harder about how to assemble intellectually controlled accounts of second-hand experience into a somewhat ordered field of discussion, within the spirit of extrapolation-centered, practice-oriented science of design for public management. We might call this the question of synthesis or perhaps of pedagogy (to use categories borrowed from Ghoshal 2005). This is a big topic in itself (see Barzelay 2001, chapters 4-5). Moreover, we need to see how process features, participation, and context activate these mechanisms – and provide a structural basis for a sustained effort. We need to reflect on how people gain mastery over practices as well as change practices so that others can gain cognitive access to them. We must also get the balance between exploration and extrapolation right in this kind of undertaking.

Conclusion

In this essay we have outlined the defining elements of a design science of public management and defended the proposition that a design science of public management is an attractive “vision” for public management research and pedagogy. We have tried to show why Bardach’s idea of extrapolation-oriented research and extrapolation-based design is a worthy approach to implementing this vision and what is required for this approach to be done competently and scaled up by public management researchers. We have also concluded that we are reasonably confident that these requirements can be satisfied and have tried to address the principled objections that can be taken to this approach.

However, this essay is little more than a preface to the development of a fully self-conscious design-science of public management. Much remains to be done to develop an extrapolation-oriented research program. We must show how to use theories of processes (specifically, mechanisms) to do case research. Our look at specific examples and at the parallel work in fields close to public management is just a beginning. Our next step is to see how political sociologists like Tilly (1995, McAdam, Tarrow, and Tilly 2001) have used mechanisms in case research. We must also figure out how to engage more fully with the sense-making approach to organizational action (Weick 1995, 2001), especially the case studies, where Weick is clearest about the social and psychological mechanisms at work. There is also the question of how to unify analysis about leadership and semi-material artifacts. We might get some clues from social studies of science and actor-network theory, but that is only a starting point.

We know what it means to generalize about processes through case comparisons, but what does it mean to “generalize” or synthesize for purposes of a design science? In our view, this is where research and pedagogy are hard to differentiate (as in the development and critique of theories for practice), but it is also where we see the greatest opportunities to integrate/combine different approaches to providing intellectual control over the process of converting existing into preferred conditions and to draw on the relative strengths of each.
References


