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Wicked Problems: Implications for Public Policy and Management

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Abstract

The concept of "wicked problems" has attracted increasing focus in policy research, but the implications for public organizations have received less attention. This article examines the main organizational and cognitive dimensions emerging from the research literature on wicked problems. We identify several recent approaches to addressing problem complexity and stakeholder divergence based on the literatures on systems thinking, collaboration and coordination, and the adaptive leadership roles of public leaders and managers. We raise some challenges for public management in some key functional areas of government—strategy making, organizational design, people management, and performance measurement. We argue that provisional solutions can be developed, despite the difficulties of reforming governance processes to address wicked problems more effectively.

Keywords

wicked problems, complex problems, new public management, problem solving, collaboration, risk and uncertainty

Introduction

At their best, and contrary to negative stereotypes, government organizations are good at implementing policies and delivering services that are relatively

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standardized, routine, and high volume. As Kettl (2009) has shown, they perform tasks like delivering entitlements, treating patients, and administering tests efficiently, and in most if not all cases, with empathy and responsiveness to the citizens they serve. But they seem to be less well equipped to respond effectively to nonroutine and nonstandard service challenges. Not unexpectedly, some public officials find it challenging to handle the more difficult problems facing them. This is especially true of what have been called "wicked problems"—those that are complex, unpredictable, open ended, or intractable.

At first sight, grappling with wicked problems might seem like taking up lost causes. As originally defined (Churchman, 1967; Rittel & Webber, 1973), wicked problems seem incomprehensible and resistant to solution. In this context, a sensible public official or public policy scholar might look for a more amenable object of work or analysis. But in this article, we adopt a cautiously hopeful stance in respect of wicked problems based on decomposing their challenging features into more nuanced categories and seeking to understand those governmental factors that make them especially difficult for policy makers, public managers, and policy scholars to address.

We argue, first, that there are degrees of "wickedness," which can be understood by reference to multiple dimensions. We contend that while conclusive "solutions" are very rare, it is possible to frame partial, provisional courses of action against wicked problems. We then consider how the structures and processes of public policy and management complicate the task of understanding these problems and of designing responses to them. On the basis of this critical analysis, we explain and assess some strategies for tackling wicked problems, each encompassing a variety of alternative approaches. In keeping with the recognition that all wicked problems are in some measure unique, we call for judicious combinations of aspects of these approaches, suited to the particular circumstances.

The Nature of Wicked Problems

Analyses drawing critical attention to the significance of complex policy problems, and the unforeseen consequences of policy intervention in areas of risk and uncertainty, emerged in several fields during the 1970s. These analyses reflected widespread dissatisfaction with rational–technical approaches to decision making, planning, and implementation. According to the critics, rational–technical approaches assume that efficient and effective achievement of objectives can follow from adequate information, carefully specified goals and targets, and choice of appropriate methods. However, frameworks based on rational–technical decision making came under increasing fire from several quarters in the 1970s and 1980s.

First, a general critique was launched from the perspective of systems theory, according to which social and economic problems cannot be understood and addressed in isolation.

> Every problem interacts with other problems and is therefore part of a system of interrelated problems, a *system of problems* . . . I choose to call such a system a *mess* . . . The solution to a mess can seldom be obtained by independently solving each of the problems of which it is composed . . . Efforts to deal separately with such aspects of urban life as transportation, health, crime, and education seem to aggravate the total situation. (Ackoff, 1974, p. 21, italics in original)

Second, a number of writers concerned with social policy and professional education argued that the major social issues of modern life are grounded in value perspectives, and that gathering more information for scientific analysis was insufficient to understand and resolve major problems (Rein, 1976). The database for rational planning could not supplant the rich experiential knowledge of professionals concerned to enhance the quality of human services (Schon, 1983). Technical rationality could not come to grips with the professional norms and practical knowledge of those who provide valued services to individual clients experiencing real problems. Nor could it comprehend the experiences of diverse citizens who are supposed to be helped by these interventions and the values underlying their needs and desires (e.g., equity, respect, opportunity, adequacy of resources). Accordingly, the development of ever more comprehensive scientific expertise could not resolve the many difficult policy problems of the modern era. These should be understood as grounded in competing value frameworks rather than arising from gaps in scientific knowledge (Schon & Rein, 1994).

Third, within the planning and design disciplines, a radical critique of expert-driven rational comprehensive planning became widespread (Churchman, 1967; Rittel & Webber, 1973; Webber, 1978). The most trenchant emerged in Rittel and Webber's (1973) now-famous article "Dilemmas in a General Theory of Planning." They declared that the days of solving major problems through an "engineering" approach have ended. Modern society was now seen as pluralistic rather than homogeneous, and not amenable to top-down general solutions. Social groups increasingly exhibit important differences in aspirations, values, and perspectives that confound the possibility of clear and agreed solutions. Modern problems of "social or policy planning," they claimed, are different from the technical puzzles tackled by the physical and engineering sciences. The latter problems are typically "tame" or "benign" in the sense that the elements of the puzzle (e.g., a mathematics or engineering problem) are definable and solutions are

verifiable. By contrast, they claim that modern social problems are generally "ill defined," and rely on political judgments rather than scientific certitudes. In this sense, most major public policy problems are "wicked" (Rittel & Webber, 1973, p. 160), that is, they are inherently resistant to a clear definition and an agreed solution.

Rittel and Webber identified 10 primary characteristics of wicked problems:

1. There is no definitive formulation of a wicked problem.
2. Wicked problems have no "stopping rule" (i.e., no definitive solution).
3. Solutions to wicked problems are not true or false, but good or bad.
4. There is no immediate and no ultimate test of a solution to a wicked problem.
5. Every (attempted) solution to a wicked problem is a "one-shot operation"; the results cannot be readily undone, and there is no opportunity to learn by trial and error.
6. Wicked problems do not have an enumerable (or an exhaustively describable) set of potential solutions, nor is there a well-described set of permissible operations that may be incorporated into the plan.
7. Every wicked problem is essentially unique.
8. Every wicked problem can be considered to be a symptom of another problem.
9. The existence of a discrepancy representing a wicked problem can be explained in numerous ways.
10. The planner has no "right to be wrong" (i.e., there is no public tolerance of experiments that fail).

Challenges of Wicked Problems

The concerns about wicked problems, and their challenges for contemporary governance and policy making, are linked in part to ongoing debates around the proper role and scope of government. Clearly, the role of the modern state has expanded greatly during the last century or so. But in the 1970s and 1980s, some political leaders were attempting to reduce the "overloaded" role of government, and to lower community expectations about the capacity of governments to address a wide range of major issues. Rather than further extend public regulation to solve problems, they advocated greater responsibility for individuals and communities, and greater use of market mechanisms (Reagan, 1987; Rose, 1979). However, in more recent decades, some political leaders have remained determined to undertake large initiatives to address complex problems—even though such interventions might be based

on imperfect knowledge, and even though the desired outcomes could take many years to emerge. The methods available to understand and respond to such problems are therefore of great significance.

Concerns about wicked problems have also arisen in relation to dealing with disasters and crises of various kinds that throw into relief the (in-) capacities of governmental systems to prepare, coordinate, and rapidly mobilize resources. Donald Kettl (2009), in reflecting on the inadequacy of governmental responses to disasters such as Hurricane Katrina, has argued for the adoption of what he calls "nontraditional/adaptive/networked strategies" to address nonroutine problems. The argument that exceptional events, such as disasters, may require new types of policy response may be more plausible than the claim by Rittel and Webber four decades ago that new approaches would become necessary to deal with fundamental aspects of modern life that tend to promote complexity, interconnectedness, pluralism, and uncertainty. Roberts suggests that a heightened awareness of value differences has emerged in parallel with the expansion of democracy, market economies, international travel, and social exchanges (Roberts, 2000). In addition, the literature suggests that many problems are marked by deep-rooted disagreements about the nature and significance of particular problems and possible solutions (e.g., policies concerning environmental protection, poverty, crime, welfare services, immigration, and citizenship). The diverse sources of policy divergence on complex value-laden issues underline the point that there is no "root cause" of complexity, diversity, uncertainty, and ambiguity—hence, there is no root cause of "wickedness" and no single best approach to tackling such problems.

If, for example, it is claimed that the fundamental cause of wicked problems is stakeholder disagreement (i.e., conflicting values and perceptions), this claim already implies a preferred "solution" pathway of *reducing conflict through dialogue*. Thus, some analysts tend to favor participatory and dialogue-based approaches to goal setting, planning, and strategizing (e.g., the urban planning work of Healey, 1997, and Innes & Booher, 1999). If, however, it is claimed that the fundamental problem is insufficient knowledge about social processes, the implied pathway is *further research* and data collection to fill knowledge gaps and improve the information base for decision makers and stakeholders (e.g., Mosteller & Boruch, 2002; Petticrew & Roberts, 2005). Thus, problem definition tends to imply a preferred solution. Some caution is therefore required with any proposed methods or approaches for addressing wicked problems, as they are likely to be provisional and incomplete in various degrees.

"Wicked problems" have been considered in a variety of case studies, since the 1970s, across several scholarly disciplines, including public

management and governance (Australian Public Service Commission [APSC], 2007; Fischer, 1993; Harmon & Mayer, 1986; Head, 2008c; Roberts, 2000), climate change response policy (Lazarus, 2009), natural resource management (Allen & Gould, 1986; Freeman, 2000; Kepkay, 2002; Salwasser, 2004; Weber & Khademian, 2008), health care policy and programs (Blackman et al., 2006; Glouberman & Zimmerman, 2002; Kreuter, De Rosa, Howze, & Baldwin, 2004), urban and regional planning (Christensen, 1985, 1999), business management (Camillus, 2008; Pacanowsky, 1995), and cybernetics research (Conklin, 2006). Recent writers have tended to emphasize that attempts to address wicked problems often lead to poor results or unforeseen outcomes.

Wicked problems are generally seen as associated with social pluralism (multiple interests and values of stakeholders), institutional complexity (the context of interorganizational cooperation and multilevel governance), and scientific uncertainty (fragmentation and gaps in reliable knowledge). Rittel and Webber (1973) made the radical claim that there are no reliable criteria by which to assess the success of different approaches, and that learning by experience is not readily available in these matters. However, we take a more pragmatic view. Along with more recent writers (e.g., Dobuzinskis et al., 2007; Head, 2008b; Nutley, Walter, & Davies, 2007), we argue that although every "solution" for dealing with a wicked problem is necessarily open to further interrogation and adaptation, this is no bad thing. Robust evaluation frameworks are not always in good shape for helping public officials understand successive attempts to address ongoing social issues (such as poverty, crime, child abuse, and urban decay), and different value perspectives on many issues preclude consensus formation. However, we argue that important learning and evaluation processes emerge from the adaptive management experience of working at multiple levels with a range of policy instruments. The process of democratic political debate provides a robust testing ground for sifting the practical merits of options and for assessing support for policy choices.

Complexity, Diversity, and Uncertainty

We propose it is useful to identify a spectrum of problem types, which would not only help to explain the features typical of wicked problems generally but which would also throw light on the differential features and intensities of different problems. Not all problems are simply tame or simply wicked, as Heifetz (1994) and Roberts (2001) pointed out. In his work on leadership, Heifetz proposed a typology of different problem situations confronting managers, ranked in ascending order of difficulty. Type 1 situations are those

where both the definition of the problem and the likely solution are clear to the decision maker (e.g., the manager or policy expert). These situations require technical work on the part of decision makers and those subject to their decisions. Type 2 situations are those where the definition of the problem is clear, but the solution is not—typically because the relevant cause-and-effect relationships are hard to discern—and therefore learning and discussion are required by both the governmental managers and the stakeholders they lead. In Type 3 situations, both the problem definition and the solution are unclear, and more extensive learning and discussion are required for all concerned. We suggest that Type 1 situations constitute "tame" problems, whereas Type 3 situations, and perhaps many Type 2 ones, will contain some features of "wicked" problems. Roberts (2001) suggested a similar taxonomy distinguishing between tame, complex, and wicked problems.

Thus, at one end of the spectrum, tame problems are those currently regarded as capable of standard or routine solutions. They have low levels of complexity and disputation and thus low perceived levels of uncertainty. Of course, over a period of time, some of these problems may come to be seen as more controversial or more complex and thus as requiring other approaches and solutions. Tackling key challenges through nonstandard processes of adaptive management and networked governance becomes more important as problems exhibit higher levels of uncertainty and stakeholder contestation, for example, where key actors take divergent approaches to problem definitions and possible solutions.

The policy literature suggests that what counts as a problem and what counts as a solution are heavily shaped by institutional history and stakeholder perspectives (e.g., Kingdon, 1995; Sabatier, 2007). The ideas and practices underpinning different views of policy problems and solutions are only partially shaped by scientific knowledge. In a world of constrained or "bounded" rationality (Jones, 1999), lack of consensus reflects differences in values and experience; appeals to scientific expertise will seldom generate acceptable solutions. Calls for more rigorous use of evidence in policy making demonstrate the inherent difficulties of achieving consensus about the knowledge bases required to address complex problems. These difficulties may arise from intricate interdependencies of processes and structures, uncertainties inherent in the dynamic nature of social issues and processes, the incommensurability of potential risks, and the diversity of stakeholders (Koppenjan & Klijn, 2004). The scientific research sector attempts to improve the knowledge bases to better understand complex patterns of causality and the interdependence of issues. However, the authority of "science" has itself been deeply compromised in the modern context of social media and values-based political debate (Pielke, 2007).

Provision of a more secure knowledge base is therefore only one part of the challenge of dealing with ambiguity, uncertainty, and value disagreements. There are not only cognitive-analytical challenges but also communicative, political, and institutional challenges to building a more shared understanding. As the number and variety of actors, groups, and organizational units involved in a complex issue increases, the need for high-quality management and leadership processes becomes more crucial (Conklin, 2006; Feldman & Khademian, 2007; Kettl, 2009). From the decision maker's point of view, diversity of either actors or institutional locations poses broadly similar kinds of difficulties. Both entail a range of perspectives, values, and knowledge bases relevant to the issue. Actors may have divergent interests or values that prompt them to be in conflict about the nature of the problem and how to deal with it. They all have expectations of the decision maker, and they all constitute or mobilize potential sources of information, permission, or resources. These divergent contributions need to be shared to identify/define problems and consider appropriate responses to them.

In general, the more complex and diverse the situation, the more wicked the problem. For the decision maker, complexity and diversity create higher levels of uncertainty or ambiguity. The forms they take in a particular case will be tied to a range of factors—institutional arrangements, group behavior, ideologies, issue histories, research findings, media biases, and so on. We argue there are different kinds of wicked problems, and by implication there could be different types of appropriate responses to them. In particular, there is more to tackling wicked problems than engaging in a process of collaboration, which has tended to be the most characteristic response of governments and policy makers. We argue for a more pragmatic approach, in which the type of response is tailored to the types of wickedness the problem seems to exhibit. Moreover, in the absence of clear and definitive solutions, according to Conklin (2007), "You don't so much 'solve' a wicked problem as you help stakeholders negotiate shared understanding and shared meaning about the problem and its possible solutions. The objective of the work is coherent action, not final solution" (p. 5). The initial challenge for public-sector managers and policy analysts may be to establish enabling conditions whereby provisional solutions can be discussed and decided. Public decision makers may occasionally claim to offer solutions to wicked problems (e.g., by redefining them or by advocating a preferred policy instrument such as markets to handle some of the "messy" trade-offs). We argue here that some approaches are likely to be better than others, and that some combinations of approaches may be relatively effective for finding provisional solutions to some problems.

Public Management's Shortcomings in Dealing With Wicked Problems

Tackling wicked problems is challenging not only because of their inherent complexity but also because the mechanisms of public-sector management tend to complicate and hamstring efforts to resolve such issues. These structures and processes have evolved over time, with each new phase overlaying rather than completely eliminating its predecessor. Each phase has manifested its own characteristic approaches to the key management functions of deciding what to do, organizing, budgeting, financial management and controlling performance, and exhibited its own typical cultural norms.

Traditional hierarchical forms of public administration have not been conducive to grappling productively with wicked problems. Hierarchical forms of organization and systems of control, focused on input monitoring and process compliance, substantially limited the opportunities to think expansively about policy issues of the type that might be thrown up by wicked problems. The tendency to recruit administrative employees at entry level and retain them in the same organization, and to foster specialization in areas of professional expertise, made each department a cultural fortress. It tended to create "silos" or "stovepipes" demarcating functional areas within organizations (Wilson, 1989). All of this was reinforced by a budgetary process that featured line-item appropriations of inputs. The combination of traditional bureaucracy and interest-group politics led to a "muddling through" approach (Lindblom, 1979) that could not address the big issues in a comprehensive way.

The sets of practices introduced from the 1980s generally termed "New Public Management" (NPM) were designed in part to address some of these shortcomings of traditional administration (Hood, 1991; Pollitt, 1990). However, we argue that NPM practices have generally been ill-suited to dealing with wicked problems. This is so whether we are referring to its initial intraorganizational focus—sometimes labeled "managerialism" or "corporate management"—or its more contractualist focus entailing purchaser–provider splits, outsourcing, and privatization.

Managerialism—best characterized as "managing for results"—entails orienting the public-sector organization's structure, coordination mechanisms, financial management, staffing, and rewards toward the achievement of results, broadly conceived as either sets of program purposes or as groups of people served by programs. It was modeled on the multidivisional form of leading private-sector corporations, each with a corporate headquarters overseeing various business units, which it controlled through setting and monitoring performance outcomes (Alford, 1998; Boston,

Martin, Pallot, & Walsh, 1996). Staffing at senior levels increasingly focused on general managerial skills rather than professional or technical content knowledge. Budgeting systems were typically oriented to appropriations by programs.

Central to managerialism has been a rational–technical approach to making decisions, adopting corporate strategy methods from the private sector. Initially, this took the form of rational comprehensive planning—the very phenomenon to which Rittel and Webber's original paper was a response. It entailed formulating corporate objectives for the organization, delineating discrete programs related to those objectives, setting out clear outcomes for each program, drawing up action plans for achieving those outcomes, and measuring the extent of achievement at regular intervals (Frederickson & Frederickson, 2006; Radin, 2006). This model assumes that each public organization has settled goals, a supportive political environment, and control over the resources and capabilities necessary to deliver on the goals—none of which necessarily apply in the presence of wicked problems.

However, it is not only its decision-making approach that limits the capacity of managerialism to grapple with wicked problems but it is also the structures and processes through which it implements those decisions. To the extent that performance-based managerialism moves away from a focus on inputs and processes, and focuses attention further down the chain of "program logic" toward outcomes, managerialism potentially allows flexibilities in finding *alternative* means of achieving the desired results. But to the extent that it holds managers responsible for a specific set of programs or for serving a specific set of clients, the corporate management framework tends to isolate from each other those programs that may actually have subterranean connections in respect of certain wicked problems. This fragmentation manifests itself in tensions between program-based subcultures, competing policy priorities, and, at worst, turf wars within and between agencies.

This fragmentation was intensified by contractualism in three ways. First, contract-based service-delivery models tended to shift the focus back along the "program logic" chain from outcomes to outputs. This stemmed from the necessity to delineate very precisely what was required of producers in contracts; it is usually easier to specify specific outputs than broader outcomes (Carter, Klein, & Day, 1992; Wilson, 1989). But prescribing a particular output as the means for achieving an outcome tends to limit the scope for imagining other means for doing so. Second, contractualism entailed separating service-delivery functions from those devoted to formulating policy, deciding what services were needed, and arranging with providers to deliver them.

This "policy/delivery" separation, or "purchaser–provider" split, also had the effect of fragmenting knowledge and understanding about factors that might cause or at least influence wicked problems. In particular, they tended to block opportunities for service providers, who were closer to the "coal-face," to provide feedback to purchasers about operational problems and about service-users' concerns that might be indicators of underlying problems (Stewart, 1996). To the extent that the providers may be private-sector firms or voluntary/community organizations, the separation is all the greater, because of the different incentives and cultural norms they exhibit. Third, contractualism entailed the establishment of competition between service providers (O'Flynn & Alford, 2008). Designed to drive efficiency and effectiveness, this also had the effect of undermining cooperation among those who might collectively have significant information or insights relating to wicked problems. Competition gave them an incentive to withhold rather than share knowledge (deHoog, 1990).

These impediments to addressing wicked problems are reinforced by some of the systems and controls that have also accompanied NPM. Financial management processes have been recast in the form of output budgeting and accrual accounting, which demand in an unchallengeable technical fashion that entities and relationships be thought of in terms of results, and generally make it harder to explore cross-agency solutions relevant to wicked problems. Individual employment contracts and performance-based remuneration of staff, especially of managers, also reinforce this tendency, enjoining employees to give priority to their silo's concerns. However, the greater emphasis on employing more generalist managers, and the increased flexibility of movement of staff across public agencies, may foster broader knowledge and experience more likely to be conducive to thinking laterally about the types of issues that involve wicked problems.

In the same vein, although almost all organizations publish well-crafted corporate plans and report earnestly on performance against those plans, the further evolution of NPM has given potential scope for less linear approaches, such as the processes that agencies utilize for developing strategies, from top-down edict-issuing to bottom-up consultative mechanisms involving all levels of the organization (and beyond) in their formulation. Thus, there is some space opening up for modes of purpose setting and decision making other than the rational goal-directed model. In particular, the recent trend toward more robust community consultation and stakeholder engagement by public agencies (Bryson, Crosby, & Stone, 2006; Hajer & Wagenaar, 2003) implies a greater willingness to open the processes of goal setting and strategy development.

In short, the conventional structures and systems of the public sector are not scoped to address the tasks of conceptualizing, mapping, and responding to wicked problems. Project management for tackling wicked problems through long-term targeted interventions would require a substantial and unaccustomed degree of flexibility in the structures and systems of public governance. More generally, addressing wicked problems calls for public officials to forge new ways of thinking, leading, managing, and organizing that recognize the complexity of the issues and processes, and that make new demands not only on their own organizations but also on other relevant actors and institutions in their environments. The remainder of this article addresses these possibilities.

Strategies for Dealing With Wicked Problems

Public management research and practice have begun to address not only the conceptual difficulties but also the practical challenges of tackling "wicked problems." This work requires attention to complexity, uncertainty, and disagreement. Moreover, calls for "more research" or "more science" to address knowledge gaps are not a sufficient response, even though better information is obviously a valuable contribution both for "evidence-informed" policy making (Head, 2008b; Sanderson, 2006) and for increasing the scope of consensus. Public managers and researchers have been actively considering a range of strategies and processes to tackle these problems. Perhaps most widespread is some form of collaborative or networked management, wherein managers work across boundaries with others who have relevant knowledge and a stake in the complex issue they are grappling with (Weber & Khademian, 2008). In our view, this widespread focus on "collaboration" as a process solution to wicked problems is important but requires other measures. It is not always the primary or the best option among possible responses to wickedness, primarily because collaboration alone does not necessarily address all aspects of the complexity challenges. Therefore, we additionally consider two further approaches: broader ways of thinking about variables, options, and linkages; and new models of leadership that better appreciate the distributed nature of information, interests, and power. We also include a brief consideration of the secondary changes to management structures and processes that might support these strategies. Not only is each of these strategies important in itself in tackling wicked problems but the literature also highlights the important role of the interaction *between* them (see Chrislip & Larson, 1994; Crosby & Bryson, 2005; Huxham & Vangen, 2005; Lasker & Weiss, 2003).

Broader Ways of Thinking About the Variables, Options, and Linkages

There have been many calls in recent decades for more holistic approaches to thinking broadly about major social problems and about the possible ways of addressing them. Taking a broad contextual approach allows greater room to discover alternative means of solving problems. We will briefly note three aspects of this style of thinking.

First, Schon and Rein (1994) advanced an approach founded in what they called "frame reflection." They argued that there are endemic problems in social policy that are not amenable to definitive solution either by authoritative determination (e.g., regulation) or through appeals to scientific knowledge. Intractable disputes, according to Schon and Rein, are likely to be grounded in different "frames" and value perspectives rather than in disagreements about scientifically verified knowledge. Wicked problems therefore are not able to be understood and solved by scientific reports and new research. Such issues can only be understood and discussed clearly by addressing the value perspectives that frame the understanding of issues and possible solutions. Much policy debate takes the form of bargaining in the political marketplace to achieve temporary compromises on difficult issues, but the underlying differences may persist. According to Schon and Rein, an alternative approach is to construct a metaframe that builds on the conflicting frames of reference deployed by key actors. Depending on the scale of the issue, it may be feasible for policy designers to involve the antagonists themselves in constructing a shared narrative that recognizes multiple voices, teases out the implications of these value preferences, and seeks to resolve conflicts.

This activity is partly analytical and partly discursive—stakeholders are confronted with the responsibility for working through the implications of a more coherent approach. There may also be an important contributing role for researchers and policy analysts by delineating the factors shaping a complex situation, mapping the complex patterns of causality at work, and calibrating the likely effects of new interventions or programs. In some cases, the analytical task may be assisted by deeply involving nongovernment stakeholders who have expertise in delivering services and in evaluating performance. For example, Schorr (2003) has developed workshop methodologies for mapping the challenges faced by human service professionals in both understanding the complex issues and developing more effective approaches to address the well-being of children and youth in poor suburbs.

Second, systems thinking, in the nontechnical sense adopted by Senge (1992), Chapman (2004), and Seddon (2008), attempts to overcome the

mechanistic and linear metaphors of "command-and-control" that tend to be common in organizations, taking instead a more holistic and interactive approach to causes and impacts. Systems thinking accepts that social knowledge is provisional and context dependent. It entails consideration not only of the desired outcomes but also of the complex web of inputs, processes, and outputs that lead to these outcomes. This includes considering not only the core production process within the relevant organization but also the auxiliary or parallel processes outside each organization, across other organizations, or in the wider society. This approach can be deployed to search, in a relatively comprehensive way, for factors that may contribute to the nature of a wicked problem and factors that can contribute to its being addressed. Systems thinking in this way can be helpful in understanding the complexity dimension of wicked problems, but it is less applicable for dealing with the political and communicative aspects of wicked problems. Other analytical approaches to establish the program logic for particular policy settings include cognitive mapping (Toulmin, 2001), causal mapping (Axelrod, 1976; Bryson, Ackermann, Eden, & Finn, 2004), and logic modeling (Millar, Simeone, & Carnevale, 2001).

Third, complexity theory has been used to highlight some of the chaotic and contradictory aspects of policy interventions in complex settings. It was developed in the physical and computational sciences and has recently been applied to policy and institutional issues (Geyer & Rihani, 2010; Kiel, 1994; Schneider, 2012; Tiesman et al., 2009). Key ideas from complexity science, such as interdependence, feedback loops, emergent features, and surprises, have been adopted in environmental policy to explain ecological processes and the impacts of human interventions (Berkes et al., 2003). Much of this work has been closely linked with accounts of how "adaptive management" is required to respond flexibly to the changing social and institutional contexts and challenges, and how policy networks can positively respond to rapidly changing circumstances (Berkhout, Leach, & Scoones, 2003; Haynes, 2003; Tiesman et al., 2009). The main uses of complexity theory have been to aid the analysis of complex trends and challenges rather than to demonstrate more effective solutions. These aids to analysis can usefully supplement the other major approaches to be considered below: collaboration and coordination, the role of leadership, and the need for enabling processes in public governance.

Collaboration and Coordination

The research literature on addressing complex problems suggests that cooperative approaches are likely to be central instruments (e.g., Alford &

O'Flynn, 2012; Bingham, Nabatchi, & O'Leary, 2005; Lovan et al., 2004; O'Leary & Bingham, 2009). In recent decades, more collaborative arrangements have been emerging between many different types of partners (Kickert, Klijn, & Koppenjan, 1997; Mandell, 2001; Wondolleck & Yaffee, 2000). Collaboration and partnering can take many different shapes—for example, between organizations within the same governmental jurisdiction or between different levels of government, or alternatively the relationships might be forged across sectors, that is, between government agencies, private firms, and nonprofit/community organizations (Agranoff & McGuire, 2003; Goldsmith & Eggers, 2004; Imperial, 2004). It can entail different mixes in the roles played by partners, such as defining policy, implementation, or resource provision (Agranoff, 2007; Savas, 1987).

The literature reflects this diversity with varying perspectives based on (inter alia) policy network theory, resource dependency theory, exchange theory, and collaboration as a management issue—which not only differ from each other in defining respects, founded in their disciplinary origins, but also converge in other respects (for a useful survey, see Sullivan & Skelcher, 2002). There are also important conceptual distinctions between degrees of closeness of relationships, for example, cooperative, coordinative, and collaborative approaches (Keast, Mandell, Brown, & Woolcock, 2004). For our purpose, collaborative working may include greater or lesser degrees of either voluntarism or formal contractual partnering. At its core, however, it entails at least some degree of shared understanding, agreed purposes, mutual trust, and usually an element of interdependence (Huxham & Vangen, 2005), which usually require time, effort, and skill to bring about. These processes are part of a potentially virtuous circle: they enable more successful collaboration, but in turn they are reinforced by the resultant cooperation (Ansell & Gash, 2008). With that in mind, our focus here is not so much on what facilitates collaboration as on the impact of collaboration on wicked problems. We find many points of convergence between the different literatures on this critical aspect.

The presence of collaborative relationships is likely to enhance the understanding and addressing of those wicked problems where there are multiple parties with differential knowledge, interests, or values. This is one form of what Huxham and Vangen (2005) called "collaborative advantage," a term that includes, inter alia, a role for collaboration in tackling the kinds of problems we normally regard as "wicked" and for which there is no other way, such as poverty, crime, or drug abuse. Where collaboration is operating effectively (Ansell & Gash, 2008; Head, 2008a), it can help in addressing wicked problems in three ways.

First, the presence of functioning cooperative networks increases the likelihood that the nature of *the problem* and its underlying causes can be better,

if not entirely understood (North, 2000; Padilla & Daigle, 1998). This manifests itself as a shared understanding of the problems and overarching purposes (Bentrup, 2001; Pahl-Wostl & Hare, 2004). This not only arises in part from a shared ownership of the deliberative process (Gunton & Day, 2003; Tett, Crowther, & O'Hara, 2003) but also arises from the involvement of a wider array of actors, offering more diverse insights into why a situation has arisen.

Second, collaboration increases the likelihood that provisional *solutions* to the problem can be found and agreed upon, not only because a wider network offers more insights but also because greater cooperation improves the prospect that diverse parties (who may have differing interests concerning the issue) may reach an understanding about what to do. This follows from having pooled knowledge and openness to joint problem solving (Chrislip & Larson, 1994), and is sustained by "small wins" as collaboration evolves (Ansell & Gash, 2008; Levine & White, 1961).

These roles of problem and solution identification in collaborative governance are equally significant in the network literature (Rhodes, 2007). As noted by Agranoff (2007),

> It is rare that a single government or agency has a monopoly on potential problem solutions . . . Some problems such as nonpoint source pollution involve a wide range of actors . . . The information function in networks is core to its operations because multiple parties must be convened to explore the various dimensions of a problem, to become aware of the technology used to deal with each facet of a problem. (p. 222)

Third, it facilitates the *implementation* of solutions, not only because the parties are more likely to have agreed on the next steps but also because it potentially enables shared contributions, coordinated actions, and mutual adjustments among them as problems arise in putting the agreed solution into practice (Koppenjan & Klijn, 2004; Mandell, 2001), enhanced by bestowing autonomy and hence flexibility on organizational representatives (Bardach, 1998).

A number of characteristics of collaborative arrangements enable these effects to be realized. Some of them reside in the practices of managers in networks. Feldman and Khademian (2007), for instance, identified "inclusive management" as a set of practices that create "communities of participation," including informational work ("recognizing ways of understanding policy issues and disseminating information about these different ways of knowing") and relational work ("creating connections between the people who need to work together"; Feldman & Khademian, 2007, p. 311). This enables parties

with different ways of knowing a contentious issue to recognize other viewpoints.

Equally important is that collaborative networks can tap into a wider body of specific knowledge and skills than can unilateral decision makers. The broader array of parties within such networks may bring to the cooperative arena different and in some cases complementary *expert* knowledge, based on their professional and other training, and *situational* knowledge, based on their social or institutional location. To the extent that some of the parties already have experience in dealing with collaborative arrangements, they may also bring useful skills concerning the establishment and maintenance of working relationships.

Of course, there is no guarantee that these different elements of knowledge will come together in a fruitful fashion. In particular, parties with conflicting interests may wield their knowledge to engage in gaming behavior—indeed, this may well be part of what makes the problem "wicked." Moreover, expertise may be harnessed to sharpen and inflame political conflicts. Consequently, two other characteristics of collaborative arrangements are also important in enabling this knowledge to be productively brought to bear upon intractable problems. The first is that collaborating parties are likely to engage in regular *communication* as a normal part of their collective endeavor. This means there will be more circumstances arising in which parties raise matters that may be symptoms of wicked problems, increasing the likelihood that someone may "join the dots" and discern an underlying issue. Communication among the parties increases the likelihood of them engaging in problem-solving behavior and finding ways forward, for example, by identifying "win–win" solutions, which typically depend on contending parties revealing pieces of information about their own situation and preferences. Communication also assists in the processes of mutual adjustment as problems arise in implementation. Where parties are far apart, an intensive process of facilitated dialogue may be necessary to allow these views to be adequately voiced as a basis for further negotiation and common ground (Campbell, 2003; Forester, 1999; Lewicki et al., 2003).

The second characteristic of collaboration that assists in dealing with wicked problems is that it entails a degree of *trust and mutual commitment* among the parties (Bardach, 1998). This increases the probability that parties will feel comfortable about revealing information that may make them vulnerable to opportunistic behavior by other parties. To the extent that they trust each other, actors will be more likely to take the risk of disclosing such information, thereby enhancing the extent to which differential knowledge is brought to bear on the problem. They are also more likely to proceed with collaborative courses of action to tackle such problems where they are depen-

dent on the trustworthiness of others. Trust is therefore an important foundation stone for harnessing collaborative working to address wicked problems.

However, although trust is necessary for collaborative arrangements, it is also very difficult to establish and build, especially in the public sector (Alford & O'Flynn, 2012). Ideally, for trust to grow, it is necessary for parties to demonstrate reciprocity and to avoid reneging on undertakings. The trust-building effects of these actions take time to be realized (O'Leary & Bingham, 2009). They also require some autonomy on the part of the people in the relationship. These conditions can be difficult to maintain in the context of a public sector that is prone to turbulence (and inconsistency over time), and where accountability regimes reduce managers' autonomy and constrain their ability to avoid reneging or to engage in reciprocity. Indeed, these characteristics of the public sector may in themselves contribute to the "wicked" characteristics of some situations. To a degree, their effect on collaboration and trust building can be ameliorated, but not eliminated, by devices such as staff development, flexible organization structures, and conscious attention to anticipating risks and "managing the authorizing environment," including good communication between political and administrative leadership groups (Bardach, 1998; Moore, 1995). Collaborative ventures can also be prone to other shortcomings, such as vulnerability to political or financial barriers that diminish energy, power asymmetries, excessive focus on process, vague understanding of (often multidimensional) performance, and many others (see McGuire & Agranoff, 2011).

In summary, collaboration offers one way of recognizing the complexity of problems and engaging the multiplicity of actors affecting the "wickedness" of a problem. But it can be difficult to establish and sustain robust collaboration in a public-sector context subject to turbulence and strict accountability rules. As Huxham and Vangen (2005) caution, "Seeking collaborative advantage is a seriously resource-consuming activity . . . Our message to practitioners and policy makers alike is *don't do it unless you have to*" (p. 13, italics in original). Wicked problems are usually ones where "we have to," but that does not make them any easier to address.

New Leadership Roles

Overlapping these collaborative strategies and processes is growing attention to a third factor in tackling wicked problems: the role of leadership. Whereas collaboration by its nature is prone to the vicissitudes of multiple parties with varying interests and capabilities, leadership can be seen, if it is effective, as bestowing a degree of coherence and mindfulness, if not control, on its workings.

It is necessarily about the practices of managers rather than structures. It focuses on the role of leaders, particularly in inducing others to adapt to new circumstances or to accommodate contending positions. Here, we consider three main approaches to the field of leadership.

The first is the dominant orthodoxy in leadership studies, represented by writers like Jaques and Clement (1991), Kotter (1990, 1996), or Kouzes and Posner (1987), which we consider if only to register its shortcomings in dealing with wicked problems. Sometimes called "transformational leadership," it typically focuses on the CEO as "corporate hero" (Currie & Lockett, 2007). According to this orthodoxy, common in government as well as in business, a leader has two key roles (Kotter, 1990; Kouzes & Posner, 1987). One is to frame a vision (or set a direction, purpose, or strategy) for the organization—usually implying an ability to recognize what is wrong with "where we are now." The other role is to get others to pursue that vision/direction/strategy by inspiring, enabling, and empowering them to do so.

However, this conception sits awkwardly with the task of working on wicked problems. The assumption that the leader should frame a vision or set a direction implies that he or she should be capable of diagnosing problems and devising solutions to them. But Heifetz (1994) argued that leaders quite often encounter situations where it is beyond the cognitive capacities of any individual to identify what is wrong and determine ways of addressing it. The knowledge and insights relevant to the issue are instead distributed among those who are led. Moreover, the new situation may pose difficult issues for those who are led, confronting them with the need to make major accommodations with a changing reality. These situations can validly be seen as wicked problems.

Instead of transformational leadership, Heifetz (1994) offered a second approach to dealing with complex, intractable situations: adaptive leadership (see also Heifetz & Linsky, 2002; Parks, 2005). "Adaptive challenges" happen to be very common for public-sector leaders. Although Heifetz does not use the term, he is effectively talking about wicked problems. He proposes that these situations require the leader not to announce a strategy and expect compliance but rather to engage in a process he terms the mobilizing of adaptive work. Public managers (here understood as including *both* elected and appointed officials) need to go beyond the traditional notion of top-down direction. Such leaders instead should lead organizational members and/or stakeholders in undertaking *themselves* the collective work of grappling with the problem (Heifetz, 1994). In effect, those who are led are asked to perform the shared leadership role of setting a direction.

Of course, this is a complex process, and one that requires particular leadership skills on the part of the leader, but different from those in the orthodox

model. What makes it especially difficult is that followers expect the leader to provide them with a direction; they get anxious when challenged to do this for themselves. The leader's role, therefore, is not only to challenge people to do this work but also to provide the right circumstances in which it might thrive. Heifetz (1994) called these circumstances a "holding environment"—a context (such as a deliberative forum or a set of agreed behavioral ground rules) for containing the stresses of organizational members' adaptive efforts (p. 103). The leader needs to steer a delicate course between provoking people to examine uncomfortable issues and having them cope with the stress this engenders. Thus, the role is one of "identifying the adaptive challenge, keeping distress within a productive range, directing attention to ripening issues and not diversions, giving the work back to the people, and protecting voices of leadership" (Heifetz, 1994, p. 207).

Mobilizing adaptive work is therefore relevant to our spectrum of problems. It offers a facilitative method for addressing complexity by bringing forth knowledge that is beyond the compass of a leader acting alone. And it deals with diversity by involving multiple parties in a manner that not only brings out their differential knowledge but also enables the surfacing of contending values and interests, and dialogue between those in whom they reside. Depending on institutional context, there will be important and distinctive roles and responsibilities for political leaders and administrative officials in encouraging and guiding these processes.

Kindred approaches are visible in Feldman and Khademian's (2007) work on the practices of inclusive management, which can contribute to creating holding environments (see also Conklin, 2006). Stoker (2006) suggested that dialogue-based work across stakeholders, and networked arrangements to tackle shared problems, can provide useful motivation in the creation of public value. Bentley and Wilsdon (2003) argued that adaptability and agility are increasingly necessary features of governmental leadership capable of working with stakeholders to seek new approaches. However, in the governmental world of organizational power and political interests, the availability of such facilitative methods may not suffice to break through the institutional inertia and entrenched practices to produce new solutions.

The third approach is collaborative leadership, or what Crosby and Bryson (2005) called "leading in a shared-power world," which encompasses a range of perspectives united in their recognition of the interaction between collaboration and leadership. Indeed, many of them see collaboration as a significant aspect of leadership, and leadership as a necessary impetus for collaboration (e.g., Chrislip & Larson, 1994; Crosby & Bryson, 2005; Gray, 1989). Indeed, some of the skills regularly cited as quintessentially those of leadership—such as reading people, big-picture thinking, communication, influencing, trust

building, and persuading—also regularly appear on lists of collaboration skills (see Bingham et al., 2005; Goldsmith & Eggers, 2004; Williams, 2012).

Collaborative leadership entails leading without the levers of control or monetary incentives normally available in hierarchy or managerial command (Nowell & Harrison, 2010). Some might infer from this that collaborative leaders lack all but a nebulous capacity to persuade, and therefore cannot really achieve much. But the lack of powers to remunerate, or to hire and fire, by no means exhausts the panoply of ways leaders can elicit cooperation from partners. Others include the capacity to determine who is in the collaboration by virtue of who gets invited, frame the issue(s), orchestrate the agenda, recognize particular expertise, engage in win–win negotiations, spot entrepreneurial opportunities, and generally engage in diplomacy (Alford & O'Flynn, 2012; Bingham et al., 2005; Goldsmith & Kettl, 2009; Huxham & Vangen, 2005; Williams, 2012).

Both the adaptive and the collaborative leadership perspectives offer something which the orthodox transformational model does not: a means of eliciting collaborative contributions without having formal authority. But they are limited as leadership approaches to the extent that they entail the shortcomings of adaptive work and collaboration that we have already noted.

Enabling Structures and Processes

So far, we have been considering how public managers might think and act in their efforts to tackle wicked problems. But whatever their practices, they can be constrained by the structure and processes of government administration. Pursuing these strategies proposed could be a little more practicable if changes were made to structures and systems in the public sector, which we consider only briefly here. First, this new approach is likely to be easier to establish and adapt if the *organizational structure* is flexible. Typically, this involves some form of matrix structure, in which staff have a "home" responsibility in a particular function or program, but it is understood that they may occasionally be "re-posted" to a strategic project, perhaps for an extended period. Organizations need to be able to assemble and reassemble project teams as problems emerge, progress, and come to some sort of resolution. Some illuminating examples of this have been organization structures adopted by the devolved Scottish government, which has structured all of its activities around six broad objectives and various outcomes (Scottish National Government, 2012), and the Dutch civil service, where two program ministries have been established, each responsible for broad outcomes, such as the integration of immigrants into the society, and each required to draw, with the

help of a big budget, on other ministries for capabilities as required (Karre, van Twist, Alford, & van der Steen, 2012).

Second, it calls for more flexible *budgeting and financial systems*. Output budgeting constrains funding to particular product and service groupings. Yet, there is no compelling reason why budgeting and appropriation rules could not enable a given allocation to be either for an outcome, an output, or a process, all within the same budget. Importantly, it should also be possible to allow collaborating agencies to "pool" budgets. Finally, as some governments have already shown, authority can readily be devolved to make limited reallocations closer to local project management level. These new approaches would also require some careful and negotiated attention to resolving joint accountability issues that are acceptable not only to the parties but also to audit and oversight bodies (Wilkins, 2002).

Third, new strategic approaches would call for a more sophisticated or nuanced approach to *performance measurement* and program evaluation (Van Dooren, Bouckaert, & Halligan, 2010). Typically, this should focus more on the results end of the program logic, because this allows more flexibility concerning the processes by which outcomes are achieved, but it should also recognize two other things: (a) the complex feedback loops permeating these processes, and (b) the long lead times often required to address wicked problems, through greater focus on evaluating intermediate and precursor steps.

Fourth, in relation to *human resources* management, processes for the recruitment, promotion, and skills development of staff would need to be reconsidered. New approaches would require more emphasis being placed on the knowledge, experience, and skills suitable to working in more open-ended, collaborative, and adaptive situations (Alford & O'Flynn, 2012; Williams, 2012).

These changes to processes and attitudes may require rebuilding the capacity of the public sector in important ways and will therefore be subject to ongoing debate and adjustment. In particular, the enhancement of flexibility to deal with wicked problems may cut across the ongoing need to maintain conventional systems for more routine tasks—which, as Kettl (2009) pointed out, serve us well for those kinds of responsibilities.

Conclusion

Followed to its logical conclusion, the intractability of wicked problems, as defined in Rittel and Webber's (1973) generic terms, could be taken to mean that grappling with them is a futile endeavor. After all, if they are virtually impossible to comprehend and any solution throws up more problems, then why bother?

But we have put forward a more calibrated understanding of their seriousness and a realistic sense of possible responses to them, founded in the practical circumstances within which public-sector managers and organizations grapple with them. We have sought to demonstrate that efforts to deal with wicked problems are impeded by the working mechanisms of the public sector—its characteristic ways of making decisions, organizing, financing, staffing, and controlling. At the same time, we have proposed some strategies for dealing with wicked problems under these governmental and administrative constraints—such as going beyond technical/rational thinking, collaborative working, new modes of leadership, and reforming the managerial infrastructure of government. These strategies can enable partial and provisional responses to problems, amounting to shared understandings about their nature and about ways of dealing with them. They inform courses of action that make sense even if they do not conclusively solve the problem. Public-sector organizations that adopt them are more likely to at least cope with complex and/or turbulent situations. But these strategies and processes typically must coexist with those underpinning the organization's "business as usual" obligations. Moreover, they call for broad managerial capabilities, which take time and resources to develop.

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