The Last 20 Years of Empirical Research on Government Utilization of Academic Social Science Research: A State-of-th....

Article *in* Administration & Society · May 2023

DOI: 10.1177/00953997231172923

CITATIONS
10

READS
302

3 authors:

John Nelson
Georgia Institute of Technology
21 PUBLICATIONS **139** CITATIONS
SEE PROFILE

Spencer L Lindsay
Arizona State University
6 PUBLICATIONS **32** CITATIONS
SEE PROFILE

Barry Bozeman
Arizona State University
409 PUBLICATIONS **28,193** CITATIONS
SEE PROFILE

Article

Administration & Society
1–50

DOI: 10.1177/00953997231172923
journals.sagepub.com/home/aas
Sage

The Last 20 Years of Empirical Research on Government Utilization of Academic Social Science Research: A State-of-the-Art Literature Review

John P. Nelson[1], Spencer Lindsay[1], and Barry Bozeman[1]

Abstract

We organize and critique the last 20 years of empirical research on policy utilization of academic social science, offering eight recommendations for future research: (1) improvement in utilization measures; (2) greater alignment on constructs of interest; (3) greater address of different national contexts; 4) study of mechanisms connecting academic research to policymakers; (5) incorporation of knowledge on information search; (6) attention to differences between utilization of policy, social, and physical science in different sectors; (7) evaluative inquiry on the effects of research utilization; and (8) investigation of the value of research in addressing different classes of societal problems.

[1]Arizona State University, Tempe, AZ, USA

Corresponding Author:
John P. Nelson, Center for Organization Research and Design/School for the Future of Innovation of Society, Arizona State University, PO Box 875603, Tempe, AZ 85287-5603, USA.
Email: john.p.nelson@asu.edu

Keywords
research utilization, evidence-based policy, research mobilization, science for policy, policymaking

Scholars and practitioners have a shared interest in the utilization of academic research in public policy and public administration. On the academic side, many scholars desire to improve policy and practice through their research, and the promise of societal value is one of the primary justifications for social and financial support of research (Bush, 1945; Guston, 2000; Price, 1965; e.g., National Academy of Sciences, National Academy of Engineering, and Institute of Medicine, 2007). Meanwhile, appeal to (ostensibly) universally accessible, thus universally compelling, fact is one of the primary ways in which modern governments justify their authorities and actions (Ezrahi, 1990, 2004, 2012; Jasanoff, 1990, 2014; Porter, 1995); and technological infrastructures of observation, analysis, and intervention are essential to the functioning of modern states (Jasanoff, 1990; Scott, 1998). Recent contestations about "alternative facts," lamentations about the rise of a "post-truth" politics, and arguments about "following the science" only illustrate the centrality of truth claims to modern ideals of political legitimacy (Jasanoff & Simmet, 2017). If the authority to define and speak for truth were not still important, no one would be fighting over it.

But despite the importance of truth concepts in modern ideas of politics and governance; the status of science as privileged speaker of truth; and the shared interests of scholars and policymakers in maintaining the compact between government and science, policy utilization of scientific research remains difficult. This is particularly true in the social sciences. For social science, public institutions and policy decisions are often objects and not merely contexts for research, experimentation, and implementation; systems and phenomena are complex and heterogeneous; values and goals diverge between different stakeholder groups; and the viability of scholarly ideas often cannot be tested without large-scale trial (Funtowicz & Ravetz, 1993; Kline, 1995; Lindblom & Cohen, 1979; Nelson, 2011). Much social science ostensibly about or relevant to policy is never used (R. Landry et al., 2001). Many policymakers and public administrators do not find much research useful (or find it at all; Avey & Desch, 2014; Bogenschneider et al., 2019; Rose et al., 2020). Many scholars feel their research is unjustly disregarded for the sake of political expediency (see, e.g., Mooney, 2005; Oreskes & Conway, 2010). And when research is used, the results are not necessarily what either policymakers or scholars would desire (Barton et al., 2021; Broad, 2002;

Pielke, 1999; Rayner & Sarewitz, 2021; Sarewitz et al., 2004; Scott, 1998). This is true even of public policy and public administration research, intuitively relevant to public affairs and familiar to research utilization researchers.

In this circumstance, the scholar by disposition, training, and culture defaults to more research to illuminate what is going on and what can be done about it. Literature on the roles and uses of science in policy and politics is voluminous, but a limited amount of it focuses on when, how, with what effects, and why policymakers and public administrators become acquainted with and make use of academic public affairs research. Academic research deserves special attention because it is uniquely organizationally insulated from policymaking and public administration. Academia is the primary producer of non-use-inspired basic research in "Bohr's Quadrant" (Stokes, 1997), that is, work not overtly directed toward the needs of an immediate client or commissioner. Only academics primarily report their work through scholarly journals, and only academics are primarily rewarded for publications. The insulation of academic public affairs research simultaneously reduces such research's obligatory use orientation and contributes to its reputation as the gold standard of robust and neutral knowledge that (perhaps paradoxically) should guide policymaking. Yet knowledge about use of this knowledge is fragmentary and incomplete.

A substantial body of research on use of research more generally in policymaking, public administration, and the private sector does exist, going under various headings including "evidence-based" or "evidence-informed" policy or practice, "knowledge utilization," "knowledge mobilization," and "academic engagement." This literature focuses to a large extent, though not entirely, on use of physical, engineering, biological, and environmental research. This overall literature has been reviewed and summarized in several different ways. Many reviews synthesize upshots for research-policymaking relations from this broad literature (e.g., Blake & Ottoson, 2009; Capano & Malandrino, 2022; French, 2018; B. Head, 2016; Newman, 2020). D'Este et al. (2018) parse apart and summarize knowledge on the different constructs studied in the general knowledge mobilization literature, and Perkmann et al. (2013, 2021) perform a similar task for literature on academic engagement with industry. However, no comprehensive analysis and summary of the constructs studied specifically with respect to policy use of public affairs research, and of present empirical knowledge on these constructs, exist. This is an important gap because the literature on this distinctive topic is fairly fragmentary, characterized by no well-established and consistent language or theoretical framework, and in certain ways highly parochial. A comprehensive and detailed survey of this field of work would permit construction of

frameworks for more effective comparison between studies, analysis of gaps and opportunities for improvement, and, thus, a more integrated, rigorous, and complete research program moving forward.

To meet this need, this paper systematically reviews the last 20 years of empirical research on use of academic social science by policymakers and public administrators. We expand from specifically public affairs research to social science generally simply because there is too little research on only the former to merit a full review. Other social sciences share many attributes, including methods and theoretical frameworks, with public affairs research. We exclude "mixed" domains incorporating both social and physical, biological, or engineering science (e.g., epidemiology, public health, and environmental science) because literature on use of academic research in these domains tends to focus on use of physical science knowledge; and because each is characterized by methods and knowledge characteristics distinct from those of public affairs. We focus on empirical literature as this is the literature that provides the ground and material for theory, and that most clearly illustrates the scope and limits of present inquiry.

Similar to Bozeman et al.'s (2013), D'Este et al.'s (2018), and Perkmann et al.'s (2013, 2021) reviews on related topics, our review aims to provide a comprehensive overview of empirical research on policy utilization of academic social science, to summarize the present state of empirical inquiry on each construct studied under this topic, and to offer constructive critique to guide and support future empirical inquiry. We address three primary questions:

1. What aspects of use of social science research in policymaking and public administration have been empirically studied, and how have they been conceptualized and operationalized?
2. What has been learned, and what remains unknown?
3. What topical or methodological gaps, and other opportunities for improvement, exist in contemporary empirical research on use of social science research in policymaking and public administration?

Thus, this paper outlines which topics have been heavily studied and which have not, where, how, and with what results. From the literature, we synthesize organizing conceptual schemas that may be useful to future inquiry. We conclude with eight suggestions for future work based on our observations of the literature. These suggestions include (1) improvement and greater consistency in utilization measures; (2) greater alignment on constructs of interest; (3) inquiry on cross-national differences in research utilization culture and mechanisms, including greater attention to different national contexts; (4) additional

and comparative investigation into mechanisms connecting academic research to policymakers; (5) incorporation of knowledge of psychology on information search and choice; (6) greater attention to differences between utilization of policy, social science, and physical science or engineering research; (7) additional discussion and inquiry about the contextual effects and value of research utilization in policymaking; and (8) additional inquiry on the different sorts of problems that exist in policymaking and public administration and the different sorts of contributions that social science can make to their address.

Review Bounds and Procedure

We collected our literature sample through the research article database Scopus using a multi-stage bibliographic snowball procedure (explained in more detail below; see also McNally & Alborz, 2004; Wohlin, 2014). The focus is on policy utilization of academic social science research to maintain a tractable scope and to reflect its distinctive organizational position and disciplinary characteristics. Government use of academic research is commonly referred to as "research utilization" and has several more names, including "knowledge mobilization" (e.g., Cooper & Ben, 2010; Sá et al., 2011), "evidence-based policy" (e.g., Lingard, 2013; Newman, 2017); "evidence-informed policy" (e.g., B. Head, 2016) and even the appealingly simple "research use" (Logan & Graham, 1998; Scott-Findlay & Golden-Biddle, 2005). It is defined and measured in many ways, which we treat in the course of this review.

For the purposes of this study, we adopt an inclusive approach; our aim is not to define or measure utilization ourselves but to review how others have done so. Thus, we broadly treat "research utilization" as generically referring to any use of ideas, language, documentation, data, theoretical constructs, arguments, or anything else that originates in academic research by government officials. "Originating in research" does not mean only scholarly literature. Practitioners may access research through curated syntheses or reports, other grey literature, news media, blogs, social media, education, workshops, testimony, personal communications with scholars, and more, as discussed in the below subsection on "Mechanisms of Research Uptake."

As for "social science," we operationalized the construct by exclusion: not physical or biological science and not engineering. We excluded "mixed" domains drawing heavily on physical or biological sciences (such as epidemiology, public health, and energy) because the primary aim of this review is to provide insight into literature relevant to utilization of public affairs research, which is almost entirely "pure" social science in methods, content, and institutional situation. Last, by "academic research" we mean research produced by personnel primarily working and located at universities. Much

research is, of course, co-authored, and scholars often work with persons from government agencies, nonprofit organizations, and industry. When scholars are among the co-authors, we take that as "academic research," not due to a sense of institutional or professional loyalties but because parsing out would be confusing and in some instances highly impractical.

We collected our article set using a bibliographic snowball procedure through the abstract database Scopus. We began with 13 highly cited articles on research utilization indexed in Scopus, all published in 2001 or earlier. These were not, of course, all of the important articles published on the topic prior to 2002—merely a large enough subset of important articles to serve as a starting point. Our iterative bibliographic snowball article selection procedure permitted us to fill out the literature from any substantially cited point of entry. Thus, the arbitrariness inherent in selecting our "root" articles did not prevent us from covering the relevant literature. Wohlin (2014) argues that even a single seminal article can suffice for a fairly small literature like that reviewed here.

We searched for all articles indexed in Scopus that cited any of our 13 "root" articles, then winnowed the results (details below) to articles relevant to policymaking or public administration use of academic social science research and appearing in journals with a current CiteScore of 3.0 or higher. This produced "Wave 1" of relevant articles. We repeated the collection and winnowing procedure for all indexed articles that cited Wave 1, producing Wave 2, and all those that cited Wave 2, producing Wave 3. We then collected and winnowed all articles referenced in Waves 1 to 3, producing Wave 4, and all articles referenced in Wave 4, producing Wave 5. Collection was completed on 18 October 2021. In response to suggestions that our initial set of search terms might inadvertently have excluded economics-related papers, we conducted a second collection procedure specifically seeking economics-related papers on Scopus. This second procedure was completed on 22 February 2022. It did not find any articles specifically about utilization of research in economic policy, but it added five nonduplicate papers on social science research utilization generally.

The winnowing procedure used for each wave began with mechanistic limitations and ended in manual sorting. We limited each raw wave to journal articles indexed in Scopus, appearing in journals with CiteScore 3.0 or higher, and published after 2001 (noninclusive). We limited those remaining to those containing at least one item from both of the following lists of terms (or lemmatized variants) in its title, abstract, or keywords:

- Set 1: policy, policymaker, policy maker, policymaking, policy making, govern, government, agency, administrate, administration, administrator
- Set 2: academic, academia, academy, university, scholar, scholarly

We used Scopus disciplinary keywords and journal titles to limit the remaining set to the social sciences. Finally, we manually reviewed each wave to remove irrelevant articles, as well as duplicates from prior waves. Articles that discussed utilization of social science as one among several academic domains were included, as were those that discussed utilization of academic research alongside other forms of research.

This procedure yielded a final set of 97 articles, 60 of which contained some empirical content. We used a loose definition of the latter, including reflections on personal experience. We downloaded and read the 60 empirical papers. In order to investigate research topics and claims, a single author used the qualitative data analysis program NVivo to code articles by method, national context, field of academic scholarship treated, and research topics addressed (Bernard et al., 2017; Miles & Huberman, 1994). We derived research topics inductively based upon the categorizations provided in the literature. We coded method and data sources exclusively, other categories nonexclusively. This coding extracted cross-cutting research topics by which we organize the following discussion.

Our procedure excluded a variety of sources, though we believe it permitted us to capture most relevant articles published in mainstream English-language journals. As over 97% of citations in Scopus, Google Scholar, and Web of Science are to English-language sources (Martín-Martín et al., 2018); this is likely to encompass the mainstream of scholarly discussion. Fifty-three of the empirical papers—nearly 90%—drew their data from one of four English-speaking nations: in descending order of incidence, the United Kingdom, Australia, the United States, and Canada (Table 1). Of other nations, only Romania appeared in more than one paper. We thus have little information about policy utilization of academic social science outside wealthy, Western democracies—or indeed outside the Anglosphere.

Research Topics Addressed in the Literature

We have organized our discussion of research topics appearing in the literature conceptually rather than by frequency of address simply because discussion of some earlier topics provides ideas useful for discussing later topics. Figure 1 lays out the different topics treated through a simple process diagram; Table 2 provides illustrative examples of articles addressing each topic.

Extent of Research Utilization in Public Organizations

Twenty-one studies examine the extent to which policymakers and public administrators make use of academic social science. Cross-contextual studies illustrate that use varies across national and regional contexts, government

Table 1. Counts of Empirical Articles Drawing Data From Each Nation.

Nation	Number of articles (nonexclusive)
United Kingdom	21
Australia	14
United States of America	10
Canada	8
Transnational	3
Romania	2
Belgium	1
Germany	1
Israel	1
Nigeria	1
Singapore	1
Sweden	1
Tanzania	1
Uganda	1

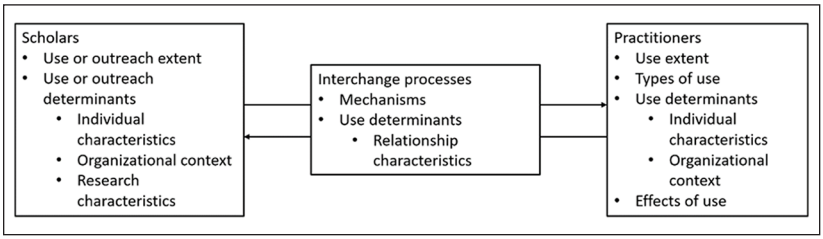

Figure 1. Map of topics studied in empirical research utilization literature, organized as a simple communication process diagram.

scales, policy domains, and particular agencies, while also being associated-with certain characteristics of individual practitioners, as discussed below. In particular, studies of developing nations, for example, Nigeria (Sanni et al., 2016), Romania (Ion et al., 2019; Petrescu & Lambru, 2021), and Uganda (Etomaru et al., 2022), find limited research utilization, while studies of wealthier nations with more established research and policy communities tend to find more (Amara et al., 2004; Cherney et al., 2012a, 2012b; Desmarais & Hird, 2014; Jennings & Hall, 2012; R. Landry et al., 2003; Newman, 2014; Newman et al., 2016, 2017; Vilkins & Grant, 2017). This is, admittedly, a rough assessment; authors use diverse methods and measures to investigate extent of research utilization (Table 3), leaving us to judge extent based on comparison between authors' own qualitative comments.

Table 2. Example Articles Addressing Each Topic Depicted in Figure 1.

Topic	Example articles
Scholars	
Use or outreach extent	Cherney et al. (2013), Weiss-Gal et al. (2017)
Use or outreach determinants	
Organizational context	Meagher et al. (2008), Knight and Lightowler (2010)
Individual characteristics	Cherney et al. (2013), Thomas and Ormerod (2017)
Research characteristics	Avey and Desch (2014), Vilkins and Grant (2017)
Interchange processes	
Mechanisms	Orr and Bennett (2012), Tilbury et al. (2021)
Use determinants	
Relationship characteristics	Broström and McKelvey (2018), Janousek and Blair (2018)
Practitioners	
Use extent	Desmarais and Hird (2014), Newman et al. (2016)
Types of use	Broström and McKelvey (2018), B. Head et al. (2014)
Use determinants	
Individual characteristics	Newman (2014), Ouimet et al. (2010)
Organizational context	Amara et al. (2004), B. Head et al. (2014)

Table 3. Measures of Research Utilization in Reviewed Articles.

Use measure	Articles using measure (nonexclusive)
Frequency of citation to academic sources in government documents	2
Scholar self-report on Knott and Wildavsky six-stage use typology	4
Practitioner self-report on Knott and Wildavsky six-stage use typology	1
Practitioner self-report on use frequency of academic research in practice	8
Practitioner self-report on importance or value of academic research in practice	6
Academic qualitative comments	2
Practitioner qualitative comments	3
Contextual integration of multiple qualitative and quantitative measures	1

Research utilization is measured in a variety of ways. Surveys of scholars and practitioners tend to ask the former whether and how frequently their research has been used by practitioners, and the latter whether and how frequently they draw on academic research or the importance that they attach to it. Some surveys further specify the question of use by adopting Knott and Wildavsky's (1980) six-stage conceptualization of research utilization, beginning with receipt of research and ending with research influence in policymaking. This rather linear and direct conception of research use may elide or fail to distinguish between certain forms of use. Its construction carries an implicit teleology, presuming that research should directly influence the details of specific decisions and has failed if it does not.

Citation analyses count references to academic sources (eliding verbal or other more subtle forms of policy effect), while case studies sometimes employ qualitative assessments of research utilization systems or infrastructure. Woolcott et al. (2020) define "cultural change" as impact, measuring a research collaboration's outcomes through 16 different document, interview, and observation-based measures. In short, most quantitative use measurements may be insensitive to longer-run, discourse-shaping forms of influence, and none makes any effort to determine the value of research use. Meanwhile, qualitative measures are highly contextual, often somewhat vague, and typically time-intensive to apply.

Functions of Research in Policymaking or Public Administration

Sixteen studies speak to what is actually happening when practitioners use research. They agree, unsurprisingly, that research can be used in several different ways in policy and public administration; and their typologies of these varieties of use overlap significantly. In their survey of 833 Canadian regional and national public servants, Amara et al. (2004) adopt Weiss's (1979, 1991) three-pronged use typology, which distinguishes among *instrumental* use—direct application to policy design or decision-making, *conceptual* use—a broader shaping of policy thought and discourse, and *symbolic* use—adventitious adoption in support of predetermined decisions. Amara and colleagues find evidence for all three types of use; all three received mean ratings roughly halfway between "negligible" and "decisive" impact in respondents' fields of practice. Conceptual use received the highest rating, symbolic second, and instrumental lowest. The authors additionally find suggestive, but statistically insignificant, evidence that incidence of use type may vary across different policy domains.

B. Head et al. (2014), in their survey of 2,084 Australian state and national public servants, construct a measure only for Weiss's instrumental impact and

report it only as part of a logistic regression model. Thus, we can say only that they found some instrumental use. However, they also queried their respondents about a somewhat different typology of uses, some of which, in our view, align with Weiss's categories:

1. Use in informing design and implementation of policies and programs (instrumental)
2. Use in changing practitioner understanding of issues or choices (conceptual)
3. Use in justifying choices already made (symbolic)
4. Use in putting issues on agenda (conceptual)
5. Use in decision-making on resource allocation (no clear equivalent)

All five queries received affirmative responses from between 22% and 46% of respondents, with federal affirmative response rates consistently lower. The above list ranks the use types from highest to lowest state affirmative response rate. Federal rankings are the same, save that a posteriori justification was (marginally) most frequent rather than third. Newman et al. (2016) add 126 interviews with respondents to the same Australian survey data to report some incidence of all three of Weiss's use types, noting that many interviewees considered symbolic use the dominant form in their experience.

A number of studies provide examples of instrumental, conceptual, and symbolic use in different academic and policy domains. Meagher et al. (2008) find some instrumental, and more conceptual, use among UK-based psychology scholars. Paris (2011) observes conceptual but not instrumental use of international relations literature on fragile states. Avey and Desch's (2014) national security policymaker respondents are generally pessimistic about instrumental use of academic research in their field, though some acknowledge—one invidiously—general conceptual shaping. Woolcott et al. (2020) illustrate "cultural shifts" through an Australian research collaboration project. Charles (2021) provides examples of instrumental use of research in Tanzanian business policy. Pizmony-Levy et al. (2021) provide examples of instrumental use in environmental education policy in New York City. Tilbury et al. (2021) provide a variety of case studies of use in Australian social work research, arguing that conceptual influence lays groundwork for instrumental utilization.

Other studies speak more to the conditions under which different sorts of use are possible. Such conditions may include stage of policy process, as Weiss-Gal et al. (2017) find in a survey of 143 Israeli social work scholars. They employ a use typology framed around a sequential conception of policy stages (Jann & Wegrich, 2007), asking respondents about the extent of their personal involvement in each stage:

1. Placing a problem on the agenda
2. Placing a policy limitation on the agenda
3. Formulating policy alternatives
4. Planning policy
5. Evaluating policy

Mean levels of reported scholar involvement in these activities steadily decrease from 1 to 4, only rising slightly for 5, with 49% reporting extensive or very extensive involvement with (1) and 17.5% with (4). Broström and McKelvey (2018) take a different angle on policy stages in a case study on the introduction of congestion charging in Stockholm, Sweden. They observe (not unlike Graffy, 2008) that policymakers have different informational needs at different stages of the policy process as they cycle between, in the authors' conception, "policy learning" and "policy implementation." "Learning" refers to an "explorat[ory]" "set of activities whereby the general direction of policy is shaped"—perhaps analogous to Weiss's conceptual use—whereas "implementation" refers to "activities where the concrete formulation of policy is determined" (p. 186)—perhaps analogous to Weiss's instrumental use.

Use-type-relevant conditions may also include the state of the academic literature or the political situation. Stevens (2011) finds extensive examples of symbolic use in his ethnographic study of UK policymaking. However, he argues that such use results not from practitioner cynicism but from the difficulties of rendering sense from an inchoate and often equivocal deluge of semi-relevant academic research (see also Boaz & Pawson, 2005). Sullivan (2011), in a case study of evaluation research in UK public policy, observes a broader sort of symbolic use, that is, the use of the enterprise of academic policy evaluation to buttress the presentation of competence and political authority of government (compare Porter, 1995). Drawing on personal experience in UK government, Newman (2011) argues that ideology dominates selection or reading of evidence in well-established policy movements or controversies, though, like Stevens (2011), he suggests that such domination of symbolic use can result from simple oversaturation of research. Bogenschneider et al. (2019) report that U.S. state legislator interviewees believe that research can be used instrumentally only in areas where political battle lines have not been well established, and that use is necessarily symbolic where they have. Andrews (2017), based on his own experience in UK government, speaks of a "situated agency" wherein practitioners have room for maneuver, shaped and constrained by political and other situational factors.

Mechanisms of Research Uptake

Twenty-two articles explore or illustrate mechanisms by which academic research reaches practitioners. Studies tend to treat this question incidentally, providing examples of mechanisms but not explicitly comparing them. Many articles provide examples of uptake via partnership—directly between scholars and policymakers (Broström & McKelvey, 2018; Cherney et al., 2012a, 2012b; Fletcher et al., 2018; Heinrich & Good, 2018; Orr & Bennett, 2012; Wilkinson et al., 2012; Yu, 2020); between scholars and advocacy groups, professional associations, or non-governmental organizations (Charles, 2021; Fotheringham et al., 2021; Meagher et al., 2008; Petrescu & Lambru, 2021; Tilbury et al., 2021; Weiss-Gal et al., 2017); and with industry (Charles, 2021; Tilbury et al., 2021). Five articles (Etomaru et al., 2022; Hinrichs-Krapels et al., 2020; Knight & Lightowler, 2010; Lightowler & Knight, 2013; Phipps & Shapson, 2009) examine practitioner-research brokering by university personnel or subunits, and four (Kitagawa & Lightowler, 2013; Meagher et al., 2008; O'Brien, 2005; Weiss-Gal et al., 2017) discuss brokering through research funding bodies or direct commissioning of research by public organizations.

Scholars can also interact directly with present or future practitioners through teaching and training (Charles, 2021; Tilbury et al., 2021), conference encounters (Janousek & Blair, 2018; Tilbury et al., 2021), direct policy advice, and legislative testimony, or, of course, temporarily or permanently becoming practitioners themselves (Bruce & O'Callaghan, 2016; Weiss-Gal et al., 2017). They can directly step into public discourse through media appearances or contributions (Andrews, 2017; Charles, 2021; Meagher et al., 2008; Tilbury et al., 2021; Weiss-Gal et al., 2017), uptake by or participation as research curators (Castillo et al., 2021) or through contributing to public consultations (O'Brien, 2005). Such public statements and engagements can in turn reach practitioners. Last, practitioners sometimes seek out academic research in databases or online without initial prompting from individual scholars (Cherney et al., 2015). Largely unexplored in the reviewed papers is the host of third-party, intermediate policy products, for example, U.S. National Academies reports (see Bozeman et al., 2019; Youtie et al., 2017), which take up academic research products and transmute them into policy recommendations without direct collaboration between practitioners and most of the scholars whose research is used.

Utilization-Relevant Characteristic of Academic Organizations and Scholars

For purposes of organization, we have grouped the wide variety of potential determinants of research utilization studied in the literature into four categories: scholar, referring to qualities of scholars and their home organizations;

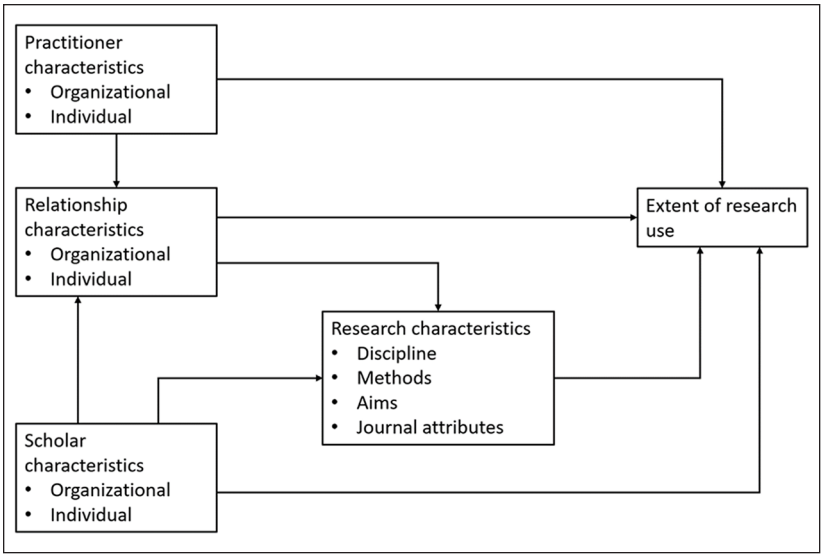

Figure 2. Conceptual model of relationships between different metacategories of potential determinants of research utilization investigated in the literature. Note that we do not expect this list of constructs to be all of those relevant; rather, these are the constructs which appear in prior literature.

content, referring to qualities of the research itself; practitioner, referring to qualities of practitioners and their home organizations; and relational, referring to qualities of the interactions between scholarly and policy communities or organizations. Fifteen articles speak to scholar qualities; we have further subdivided such qualities into organizational and individual characteristics. There is no well-agreed-upon set of relevant variables. Different scholars in the space have different foci and hobbyhorses, and articles vary in conceptual models and the explicitness thereof. As an organizing device, we integrate the various constructs investigated into a simple and high-level conceptual model that shows plausible relationships between high-level categories of investigated variables (Figure 2, Table 4).

Utilization-Relevant Characteristics of Academic Organizations

Organizational Material Support for Research Utilization and Outreach. Avey and Desch (2014) and Tilbury et al. (2021) find that research utilization often requires significant effort on the parts of scholars. This work is costly in time and sometimes money, and it requires development and maintenance of

Table 4. Summary of Previously Investigated Constructs' Relationships to Extent of Research Utilization.

Construct	Utilization relationship	Relevant articles (nonexclusive)
Scholar characteristics		
Organizational		
Material support for utilization and outreach	+	5
Incentives for utilization	+	5
Individual		
Demographic		
Age	+	1
Gender	?	2
Professional		
Discipline	A	3
Productivity	+	1
Rank	+	3
Receipt of external funding	+	3
Utilization attitudes and capabilities		
Utilization valuation	+*	5
Collaboration valuation	+	2
Policy engagement skills	+	3
Dissemination efforts	+	4
Research characteristics		
Discipline	A	1
Methods	?	3
Aims		
Advance knowledge	+	1
Meet practitioner needs	?	5
Develop theory	?	1
Journal attributes		
Impact factor	+	1
Open access	+	1
Practitioner characteristics		
Organizational		
National context	A	2
Scale	A	3
Political context	?	1
Policy domain	A	2
Interest in policy innovation	+	2

(continued)

Table 4. (continued)

Construct	Utilization relationship	Relevant articles (nonexclusive)
Access to research	?	4
Research valuation and culture	+	5
Individual		
Demographic		
Gender	?	1
Degree attainment	+	8
Background field	A	5
Professional		
Policy domain	A	4
Rank	?	2
Duties		
Implementation only	−	1
Writing	+	1
Length of tenure	?	2
Utilization attitudes and capabilities		
University work experience	+	2
Research skills	?	2
Method preference		
Quantitative over qualitative	+	2
Relational characteristics		
Research relevance and timeliness	+*	13
Research adaptation, presentation, and accessibility	+*	9
Density, quality, and continuity of scholar-practitioner relationships	+*	14
Density and quality of scholar-practitioner linkage mechanisms	+*	11
Collaboration structure	A	4

Note. Only relationships marked with an asterisk (*) have been investigated robustly with consistent results. Note as well that multiple articles addressing the same construct often emerge from a single dataset.
+Preponderance of articles have found a positive relationship between variable and research utilization.
−Preponderance of articles have found a negative relationship between variable and research utilization.
?Preponderance of articles have not found a relationship between variable and research utilization; or articles disagree.
A Variable relationship to utilization cannot be summarized by direction of association−for example, because variable is nominal and non-dichotomous.
*Variable has been subject to several studies with consistent results. Utilization relationship may, in our estimation, be treated as robust.

policy outreach skills and connections. Interviews of Meagher et al. (2008) with UK psychology scholars suggest that funding for such work is both scarce and necessary. The authors find as well that work by dedicated brokering personnel in outreach and contact events can help to forge and maintain scholar-practitioner connections. Knight and Lightowler (2010; also Lightowler & Knight, 2013), in interview studies of UK-university-based knowledge brokers, and Weiss-Gal et al. (2017), in a survey of Israeli social work scholars, concur. Sá et al. (2011) argue, based on interviews with Canadian academic administrators in education research, that organizational resource constraints can limit the actual degree of support provided even in organizations articulating a strong research utilization ethos. Knight and Lightowler (2010; also Lightowler & Knight, 2013) concur.

Organizational Incentives for Research Utilization. Meagher et al. (2008) also find, along with Cherney et al. (2012a; survey of Australian education scholars), Etomaru et al. (2022; case study of Makerere University in Uganda), and Matthews et al. (2018; interviews with UK scholars), that the incentive structures of academic institutions tend not to strongly reward knowledge utilization. Incentives thus steer scholars away from the often high-effort and high-cost outreach activities required to achieve research use. Scholars face significant time and resource constraints (Cherney et al., 2012a; Etomaru et al., 2022; L. A. Walker et al., 2019), and it is plausible that an incentive system primarily rewarding publication of scholarly journal articles can induce neglect of utilization work or opportunities.

Utilization-Relevant Characteristics of Individual Scholars

Scholar Age. If a utilization measure is conceived as lifelong, age may affect utilization simply because older scholars have had more time in which to achieve utilization. If utilization is conceived in terms of frequency, older scholars may still have an edge by virtue of associated factors such as lifelong productivity and rank, as well as simply having developed larger, denser, and longer-standing social and policy networks. In our set, only Thomas and Ormerod (2017), in their bibliometric, web, and interview study of UK-based policy scholars, study scholar age. They find it to associate positively with non-academic impact (conceived as lifelong) in two of their three regression models for the variable.

Scholar Gender. Systemic gender bias is plausibly present in public organizations and in academia and might be expected to depress female or gender-nonconforming scholars' policy impacts. L. A. Walker et al. (2019), in a survey study of UK scholars, find that male- and female-identifying scholars

report policy experience at equal rates, but that male scholars report broader and more extensive engagement with research users. Thomas and Ormerod (2017) also investigate gender but do not find it statistically significant.

Scholar Discipline. Ouimet et al. (2010) survey of 1,614 Quebecois policy analysts finds that 17% of analysts report contacting natural scientists or engineers in the preceding year, followed by the social sciences at 15% and 3% each for administrative and health sciences. Cherney et al. (2013) in a survey of scholars in education, sociology, economics, psychology, and political science find that education scholars perceive substantive application of their research at markedly higher rates than do those in other disciplines (and that the others follow in the order above). They argue that the preeminence of educational research may be due to its applied nature, its high rates of scholar-practitioner partnerships, and educational scholar sensitivity to user needs. Matthews et al. (2018), in an interview study of UK social science, arts, and humanities scholars performing government-commissioned evidence reviews, find that respondents conceptualize their relationships to the policy sphere, including the prestige (or lack thereof) of "application" work and their degree of autonomy from policymaking, in significant part through their disciplinary backgrounds. These findings do not directly speak to by-discipline variance in incidence, but they suggest certain mechanisms that may help to explain it and also point to qualitative differences in what "utilization" may look like across different academic disciplines. Matthews and colleagues' scholar interviewees vary by field in whether they regard public organizations as "clients" whose evidentiary desires the scholar must meet, or "powers" to which the scholar must "speak truth." Frequency and formats of scholar-practitioner interchange during the evidence review process vary across fields as well.

Scholar Productivity. It is plausible that greater scholar productivity could facilitate greater research utilization because a more productive scholar will have a greater volume of research to be used, may be better-known, and may carry greater authority in policy interactions. Conversely, if greater productivity is an indicator of dedication primarily to production of scholarly literature and neglect of practitioner outreach, it might be expected to associate negatively with utilization. Only Thomas and Ormerod (2017) study scholar productivity, finding it to associate positively with non-academic impact.

Scholar Rank. Academic rank is likely to associate with career length, academic productivity, public profile, and access to social and material resources, all of which could plausibly increase scholars' likelihood of attracting practitioner attention; and, more saliently, of achieving impact should they choose

to attempt it. Tenured professors may also be free of certain incentive constraints to which their junior colleagues are subject. No longer having to "publish or perish," they may have more latitude to pursue impact. Weiss-Gal et al. (2017) indeed find that academic rank associates with policy involvement among their Israeli social work scholar respondents, and Thomas and Ormerod (2017) report similar findings among UK tourism scholars. Cherney et al. (2013) do not explicitly study rank, but they do find that teaching duties negatively associate with research utilization for their economics and sociology respondents.

Scholar Receipt of External Funding. As external funding connects scholars to the needs of other, often nonacademic and sometimes public organizations, it might be expected to support relationships providing opportunities for research utilization. Receipt of external funding might also proxy for scholar skill level, productivity, or motivation. In several analyses of a single survey dataset of Australian scholars, Cherney et al. (2012a, 2012b, 2013) find that scholars who consider external funding essential are more likely to have achieved research uptake and that receipt of external grant funding associates positively with achievement of research utilization for educational and psychology scholars.

Scholar Valuation of Utilization. In keeping with the argument around incentivization, four survey studies (over three datasets; Cherney et al., 2012a, 2013; L. A. Walker et al., 2019; Weiss-Gal et al., 2017) and one case study (O'Brien, 2005) find the priority that individual scholars place on the achievement of research utilization to associate with research utilization achievement. As research utilization is not an automatic result of the characteristic activity of scholars, that is, publishing academic literature, it is plausible that scholars who place greater priority on utilization will achieve it more frequently by dint of greater allocation of resources and effort.

Scholar Valuation of Practitioner Collaboration. It might be expected that scholars who consider practitioner collaboration to be important will be more likely to pursue it and to thereby achieve utilization. Reciprocally, it is also possible that scholars with past and successful experience of research collaboration are more likely to have achieved utilization. In their survey of Australian scholars, Cherney et al. (2012b, 2013) find valuation of research collaboration to positively associate with research utilization.

Scholar Policy Engagement Skills. It is straightforwardly plausible that scholars with greater policy engagement skills are likely to have greater policy

impacts. Weiss-Gal et al. (2017) find their respondents' self-rated policy competencies to positively associate with self-reported policy involvement. Bruce and O'Callaghan (2016) interview UK sustainable development policy scholars who held temporary policy placements and find that such knowledge brokers must understand and work effectively within policy needs, culture, and processes to achieve knowledge exchange. Approximately 40% of L. A. Walker et al. (2019) UK-based scholar survey respondents state that lack of experience in working with policymakers presents a challenge to their contributing to a potential academic policy initiative, and over 30% report challenges stemming from limited guidance for or understanding of policy contribution needs.

Scholar Dissemination Efforts. It seems plausible that scholars who put more effort into disseminating their research to users will achieve more user uptake. Cherney et al. (2012a, 2012b, 2013) indeed find that utilization associates with scholars' prioritization of and engagement in dissemination activities and tailoring thereof. Thomas and Ormerod (2017) find that interviewed scholars see social media outreach as useful, but their statistical analysis does not reveal a link between web communications efforts and nonacademic impact.

Utilization-Relevant Characteristics of Research

Seven papers speak to qualities of research itself being associated with utilization.

Research Discipline. Desmarais and Hird (2014) observe in a citation study of U.S. regulatory impact analyses that research utilization incidence varies across academic disciplines. Economics journals are most frequently cited overall. The next social science in disciplinary citation rankings is business finance at rank 6 of 21. The upper rankings are dominated by environmental science, public health, and medicine. It appears that different research domains are, in practice, differentially relevant to the business of government. It should be noted, however, that the particular frequency rankings derived from regulatory impact analyses, which tend to be framed in terms of environmental, economic, and public health impacts, may not reflect overall research use patterns in government.

Research Methods. R. Landry et al. (2003) suggest that quantitative studies are likely to be more useful for instrumental modification of government programs, thus more likely to be used for these purposes (and perhaps

overall) in policy; or, it may be that since specialized skills may be needed for interpretation, they may be less likely to be used. Their survey data, drawn from Canadian public servants, are indeed indeterminate on the point. Amara et al. (2004), in their analysis of the same data, find that scholar production of quantitative products associates (positively) with all three of their forms of utilization more strongly than does production of qualitative reports, while qualitative report production still associates positively with conceptual and with symbolic use. Qualitative research does indeed tend to be more conceptual in nature. Cherney et al. (2013), however, in a survey of Australian social science scholars, do not find qualitative or quantitative research to predict utilization.

Aims of Research. Amara et al. (2004) find that a focus on the advancement of knowledge in research associates positively with increased instrumental use. Similarly to Cherney et al. (2013; but not 2012a, 2012b) and Avey and Desch (2014), they also find that a focus on practitioner needs in research associates positively, and more strongly than does a knowledge creation focus, with all three of their kinds of use. The practitioner needs focus finding is easily comprehensible in that research focused on practitioner needs is more likely to be useful to them. The knowledge focus finding is slightly more difficult to explain, and Amara and colleagues do not attempt to do so. In contrast, R. Landry et al. (2003) do not find a utilization association for knowledge focus, practitioner needs focus, or, in addition, theoretical focus.

Journal Attributes. It is plausible that more widely read and higher-profile journals are more likely to see their articles used in policy, and Desmarais and Hird (2014) indeed find that journal impact factor associates positively with rate of citation in regulatory impact analyses. Vilkins and Grant (2017), in their citation analysis of Australian government publications, do not investigate impact factor but do find suggestive evidence that open-access journals are cited at higher rates than other journals. This latter finding may align with studies showing that accessibility of research affects its utilization.

Utilization-Relevant Characteristics of Government Practitioners and Organizations

Twenty articles speak to characteristics of policymakers, public administrators, or government organizations that are associated with research use. We again separate these into organization-level characteristics and individual-level characteristics.

Utilization-Relevant Characteristics of Government Organizations

National Context. Studies comparing national contexts are rare. O'Brien (2005) offers a multi-method case study of Canadian and UK bilateral development agencies using policy analysis, citation analysis, and research funding data. He finds more extensive utilization of university research in the UK, attributing the difference to superior "institutional setting, programs [including funding of university research], and policy linkage [mechanisms]" (p. 131). Pattyn et al. (2022), in their own case study, compare Belgian and German agencies. They find that academic research use rates and the institutionalization of academic research use are much higher in Germany.

Government Scale. R. Landry et al. (2003) find that Canadian regional, as opposed to federal, governments are more likely to use university research, and Amara et al. (2004), using the same data, find that regional governments are more likely to use it symbolically. B. Head et al. (2014) find that Australian state-level public servants report academic research use at higher rates than do federal officials, though they caution that much of the difference is accounted for by low citation rates at one non-policy federal agency, the Australian Bureau of Statistics. It is possible that federal officials, at least at the Australian Bureau of Statistics, make more extensive use of in-house data or analysis and thus rely less upon external sources.

Organizational Political Context. In a comparative metanalysis of Pew and MacArthur Foundation assessments of evidence-based policy on criminal justice, juvenile justice, behavioral health, and child welfare in the 50 U.S. state governments, Yingling and Mallinson (2020) find some somewhat ambiguous results on political context and utilization. In their study, U.S. states with Democratic governors and with Republican legislatures respectively display higher institutionalization of evidence-based policy. They suggest that this is because Republican legislatures may be politically incentivized to seek evidence-based policy to constrain budget growth, while Democratic governors may be incentivized to seek evidence-based policy to improve the efficacy of government programs and to increase budgets. Republican legislatures, they argue, tend to be rewarded for limiting or reducing budgets, while Democratic governors tend to be rewarded for increasing them. They do not discuss the apparent contradiction between these incentive sets.

Organizational Policy Domain. Jennings and Hall (2012), in a survey of 217 U.S. state agency directors, find that use of "professional/scientific" information sources varies across domain is in descending order:

1. Fish and wildlife
2. Natural resources
3. Alcohol and substance abuse
4. Tourism
5. State police
6. Children and youth services
7. Transportation and highways
8. Environmental protection
9. Vocational rehabilitation
10. Developmental disabilities
11. Economic development
12. Hazardous waste management.

The authors suggest that utilization plays a more determinative role in policy on less politicized issues, aligning with Newman's (2011), Andrews's (2017) and Bogenschneider et al.'s (2019) use type findings. It is not, however, immediately apparent that the above order ranks policy domains by politicization as well. Desmarais and Hird (2014) find that citation rates to journal articles vary across U.S. government regulatory agencies, which may but does not necessarily reflect policy-domain-linked variation.

Organizational Interest in Policy Innovation. Yingling and Mallinson (2020) find "innovativeness," by which they mean rate of policy adoption, to associate with their utilization measure, which is based largely around formalization of evidence use or presentation. Yu (2020), meanwhile, in a reflection on her own experience "coproducing" a federal law enforcement research project with practitioners, argues that successful collaboration requires "a 'champion' in the practitioner community" (p. 567). The Yu finding is relatively straightforward, but the Yingling and Mallinson finding requires more interpretation. The authors suggest that, "since [evidence-based policy] as a distinct political and social movement is a . . . recent development, states which tend to adopt policy innovations more quickly, broadly speaking, are also more likely to adopt [evidence-based policies]" (p. 592). This argument does not clarify whether the link between rate of policy adoption and formalization of evidence use or presentation is government should then be expected to vanish as evidence-based policy becomes older.

Organizational Access to Research. It may be expected that greater ease of access to research within an organization—via, for example, subscription to academic databases—would facilitate research utilization. B. Head et al. (2014) do not find that reported barriers in access to university research associate negatively with utilization in their survey of Australian practitioners, but Cherney et al. (2015), in a different analysis of the same data, do. Newman et al. (2016, 2017), in more analyses of the same data, suggest that—at least in Australia—access is not much of a problem. In short, the evidence is ambiguous.

Organizational Research Valuation and Culture. It is plausible that organizational variations in priority and value placed upon academic research affect academic research use (or vice versa). R. Landry et al. (2003) find that, among their Canadian government official respondents, "user's context"—a somewhat muddy construct encompassing perceived pertinence of university research among colleagues, comparison between the value of colleagues' and scholars' work, and the timeliness of research—strongly and positively predicts research utilization. B. Head et al. (2014) and Cherney et al. (2015), both using the same dataset of Canadian government officials, find perception of colleague relevance and lack of organizational "research culture" both to predict research utilization reporting—the former positively, the latter negatively. O'Brien (2005) and Pattyn et al. (2022), in their respective case studies of UK and Canadian development agencies and German and Belgian agencies, speak of organizational effort toward or institutionalization of research use as associating with greater use.

B. Head et al. (2014) also find that Australian public servants whose colleagues include personnel with explicit research brokering duties are, unsurprisingly, more likely to use research. It is unclear, however, to what extent this association exists because the research brokers succeed in their work or because organizations (or organizational subunits) that hire research brokers are already more likely to use research.

Utilization-Relevant Characteristics of Government Practitioners

Practitioner Gender. Practitioner gender might affect research use if practitioners are affected by homophily between themselves and scholars; for example, research use by female practitioners might be expected to be higher in fields with a higher proportion of female scholars. An association between gender and position in hierarchy might also lead to gender-use associations through the rank mechanisms addressed below. Last, it is possible that gender bias could make it easier for male practitioners to command attention from

scholars. Only Newman (2014), using survey data on Australian public servants, tests for a gender effect, and he does not find one.

Practitioner Degree Attainment. Practitioners with advanced degrees may (1) be more inculcated in academic research and culture, leading them to value research more highly; (2) have more extensive and stronger relationships with scholars; and (3) have greater skill in the acquisition, interpretation, and use of academic research. R. Landry et al. (2003) find that advanced degree attainment associates with increased utilization in their survey of Canadian practitioners, as does Newman (2014; also Newman et al., 2017, with the same dataset) in his survey of Australian practitioners. Ouimet et al. (2010; also Bédard & Ouimet, 2012) find advanced degree attainment to associate with awareness and use of scientific articles among Quebecois policy analysts. Sanni et al. (2016) find degree attainment to associate with increased utilization in their survey of Nigerian lawmakers. However, Amara et al. (2004) find that possession of a graduate degree associates with increased utilization only for conceptual use. B. Head et al. (2014) do not find attainment of any particular degree level to associate with utilization in their survey of Australian public servants, though they operationalize each individual degree level as dichotomous rather than degree attainment as a single, multilevel variable.

Practitioner Background Field. A practitioner's disciplinary background may shape their attitude toward the importance of different sorts of policy inputs and evidence. Amara et al. (2004) and B. Head et al. (2014), among Canadian and Australian practitioners respectively, find that valuation of research in a practitioner's background field research positively associates with research utilization. Ouimet et al. (2010; also Bédard & Ouimet, 2012) find several practitioner background fields to associate with awareness and utilization. Sanni et al. (2016), however, do not find background field relevant in their survey of Nigerian policymakers.

Practitioner Policy Domain. Not unlike the findings of use variation across academic fields, R. Landry et al. (2003) state that reported utilization varies across practitioner policy domains. Rank-ordered from highest to lowest reported research utilization, their domains are:

1. Education and information technology
2. Social services, health, and Social Security
3. Environment, forest, fishing, and agriculture
4. Economic development, finance, and fiscal laws

5. Language, culture and immigration, justice and native affairs
6. Job creation and employment standards
7. Municipal and regional affairs, public works and public infrastructures

Amara et al. (2004) elaborate the same domains (and the same data) across their different varieties of use, finding variation in the lower half of the rank-order list across instrumental, conceptual, and symbolic utilization. Newman (2014) finds research utilization rates highest in education and social policy areas, as compared to economic, health, "research/strategy," or "resources/environment."

Practitioner Rank. It is plausible that higher-ranking officials might have greater access to research and greater social capital thus might use more research. Conversely, since—per Wildavsky (1983, p. 29; see also Simon, 2019 [1996])—"organizations exist to suppress [i.e., filter and sort]" information," lower-ranking officials might have to do more sorting through reams of research. The relationship between research use and rank may differ by policy domain, as, for example, the mid-level bureaucracies of science policy agencies tend to be populated by doctoral degree holders while mid-level bureaucrats in other policy domains may have more managerial backgrounds. R. Landry et al. (2003) do not find a difference in utilization between "professionals" and managers in their survey of Canadian practitioners. B. Head et al. (2014), in their survey of Australian public servants, do not find any individual position level to associate with research utilization—though, as with degree attainment, they operationalize ranks as individual, dichotomous variables rather than as a scale.

Practitioner Duties. Certain tasks in policymaking and public administration may show greater use of research than others. Ouimet et al. (2010) find, in their survey of Quebecois policy analysts, that those responsible for producing written documents are more likely and those responsible solely for implementation less likely to use academic research.

Practitioner Tenure in Present Position. Longer-serving practitioners might be expected to have larger and denser networks of connections, thus to have greater access to research if they want it. Conversely, newer practitioners may (if younger) have more recent experience of or connections with university research, or greater facility with contemporary information technology. Sanni et al. (2016) find years of work experience to associate negatively with utilization in their survey of Nigerian policymakers, but Newman et al. (2017) do not in their survey of Australian practitioners.

Practitioner University Work Experience. Practitioners who have worked at universities may have stronger familiarity with and connections with scholars or a greater familiarity with and respect for academic research. Newman (2014) (also Newman et al., 2017, same dataset), in his survey of Australian practitioners, indeed finds that university work experience associates with increased utilization.

Practitioner Research Skills. It might be expected that practical skills in the conduct and interpretation of research could ease practitioner research utilization or be associated with greater respect for and valuation of research. However, in their survey of Australian practitioners, B. Head et al. (2014; also Newman et al., 2017, same dataset) do not find self-report of lacking skills to associate with research utilization.

Practitioner Method Preference. Ouimet et al. (2010; also Bédard & Ouimet, 2012, same dataset) find that policy analysts reporting a preference for qualitative over quantitative articles consult academic research at lower rates than those preferring quantitative to qualitative articles.

Utilization-Relevant Characteristics of Scholar-Practitioner Relations

Twenty-seven studies speak to features of scholar-practitioner relations relevant to research utilization. Some frame a debate around Caplan's (1979) influential "two communities" thesis, which suggests that practitioners and scholars have difficulty communicating because of differences in cultural priorities, institutions, practices, and networks. Bogenschneider et al. (2019; interviews with U.S. state legislators), Cherney et al. (2012a; survey of Australian scholars), Orr and Bennett (2012; personal reflection on coproduced research), and R. M. Walker et al. (2019; comparative topic modeling of *Public Administration Review* and *PA Times*) argue in favor of this thesis, while Newman et al. (2016; survey of Australian public administrators) argue that the disconnect has been overstated. Regardless of the reading of the evidence, studies tend to agree on the importance of several features of scholar-practitioner relations, discussed in the following sections.

Relevance and Timeliness of Research. Simon (1971, 1983, 2019) frequently observed that one of the most basic scarcities in human affairs is attention. Practitioners operate under significant time constraints and, sometimes, high decision stakes and urgency, making it highly plausible that the direct salience

of research to the immediate problem at hand will be a significant determinant of its use. Newman (2011), drawing on personal experience as a UK science advisor, attests to this point, as do Wilkinson et al. (2012; UK scholar-practitioner research collaboration experience) Andrews (2017; Welsh government ministerial experience), and Phoenix et al. (2019; UK government scholar experience).

Ouimet et al. (2010; also Bédard & Ouimet, 2012, same data) find perceived relevance of research to be positively associated with utilization in their survey of Quebecois policy analysts. Cherney et al. (2012b) find self-assessed research relevance to associate positively with utilization within their survey of Australian educational scholars. Sanni et al. (2016) surveyed Nigerian lawmakers frequently consider "obsoleteness of information" to be a major obstacle to use. Avey and Desch's (2014) national security decision-maker interviewees assert that a major reason for not using academic research is its irrelevance. Newman et al. (2016), in interviews of Australian practitioners, find that practitioners consider relevance an important determinant of research use. Janousek and Blair (2018), in an interview study of scholars and practitioners at the International City/County Management Association annual conference, find their respondents to consider timeliness and relevance of information highly important. Hinrichs-Krapels et al. (2020) report on their experience using "Policy Labs" to offer policymakers timely access to relevant information. Rose et al. (2020), in a case study of the UK Parliament, consider relevance and timing two of their four "key factors" in influencing research use. In short: where studied, research relevance is highly relevant.

Adaptation, Presentation, and Accessibility of Research. It seems plausible that research is more likely to be salient, and likely easier to use as well, if its conduct, presentation, or dissemination are tailored to practitioner needs. R. Landry et al. (2003), in their survey of Canadian practitioners, find adaptation of research products to associate with utilization. Cherney et al. (2012a, 2012b) indeed find that education scholars' ratings of the importance of tailoring research to end users to positively predict their utilization. Meagher et al. (2008), using survey and interview data from UK psychology scholars, find clarity and accessibility of results to be important for research uptake. Sanni et al. (2016) find that their surveyed Nigerian lawmakers consider inaccessibility a major barrier to research utilization. Janousek and Blair's (2018) scholar and practitioner interviewees consider research accessibility highly important to useful theory-practice interchange, while Rose et al. (2020) consider accessibility one of their "four key factors" shaping research utilization in UK Parliament. Phoenix et al. (2019) attest from personal

experience to the importance of tailored and accessible presentation in scholar-policymaker interactions. Meanwhile, Fotheringham et al. (2021) report that policy official engagement in setting research agendas and diverse research dissemination efforts conducted by the Australian Housing and Urban Research Institute, a knowledge broker NGO, contribute to policy impact.

Density, Quality, and Continuity of Scholar-Practitioner Relationships. To use research, practitioners must be aware of it and consider it to be of sufficient quality or authority to merit their time. These circumstances are facilitated by relationships with scholars, which offer, in the two-communities idiom, bridges across the gap. Wilkinson et al. (2012) again attest on personal experience, as do Andrews (2017), Phoenix et al. (2019), and Yu (2020; U.S. federal law enforcement research collaboration experience).

Ouimet et al. (2010; also Bédard & Ouimet, 2012, same data) find direct interactions with scholars to associate with utilization. Cherney et al. (2012b) find education scholars' self-rated priority on maintenance of informal contacts to positively, and perception of the difficulty of research partnerships to negatively, predict utilization. Meagher et al. (2008) interviewed psychology scholars assert that effective scholar-practitioner interchange, collaboration, and utilization require time and mutual familiarity. Janousek and Blair (2018) and Rose et al. (2020) concur, as do Fletcher et al. (2018) in a study of a Scottish business research collaboration, Pizmony-Levy et al. (2021) in a case study of a New York City environmental education research collaboration, Ranchod and Vas (2019) in a case study of the Australian Social Policy Research Centre, and Woolcott et al. (2020) in a study of Australian regional research collaboration. The literature is again univocal; research utilization benefits from sustained, direct, and interactive relationships between practitioners and scholars.

Density and Quality of Practitioner-Scholar Linkage Mechanisms. If scholar-practitioner relationships are important, so too may be mechanisms of brokering and facilitating relationships between scholars and practitioners—meetings, conferences, correspondence, reports, libraries, broker personnel or organizations. The density or quality of such relationships is rarely studied, though R. Landry et al. (2003) find a composite of Canadian practitioners' ratings of the importance of different linkage mechanisms to positively predict research utilization, while Cherney et al. (2012a, 2013) find Australian education scholars' ratings of the importance of linkage mechanisms to predict use. Meagher et al. (2008), Fletcher et al. (2018), Hinrichs-Krapels et al. (2020), Rose et al. (2020), and Fotheringham et al. (2021) offer similar findings from case studies. Phipps and Shapson (2009) provide a positive example of research

brokerage through such mechanisms as workshops, forums, summaries, and community partnerships at Canada's York University. However, Knight and Lightowler (2010; also Lightowler & Knight, 2013), as discussed above, find frustration in UK university-based knowledge brokers about weakness in university-based linkage mechanisms. Etomaru et al. (2022), in a case study of Uganda's Makerere University, find scholars frustrated by the same.

Collaboration Structure. Several articles, particularly case studies and personal reflections, detail research collaborations. Of these, a few turn an eye to the particular structure of collaborations. Broström and McKelvey (2018) suggest that different policy stages are suitable to different collaboration structures. For the authors, "implementation" processes benefit from close interchange between scholars and practitioners and subordination of the former to the latter's needs, whereas exploratory "learning" processes benefit from greater scholar distance and autonomy. Yu (2020) offers a related argument, suggesting that greater scholar autonomy can for certain purposes facilitate a more distanced or independent analysis or critique. Fletcher et al. (2018) argue that effective research collaboration requires mutual identification among practitioners and scholars with "supra-organizational" collaborative objectives.

Effects of Research Utilization on Policy or Public Administration Outcomes

Only three articles attempt to investigate whether and how research utilization actually improves policymaking or public administration processes when it occurs; most take this for granted. Heinrich and Good (2018) in a case study of education research and Pizmony-Levy et al. (2021) in a case study of environmental education research are relatively sanguine, finding utilization to plausibly improve educational outcomes. Boaz and Pawson (2005), examining five different evidence reviews of mentoring in public organizations, are less so, finding the reviews to "deliver . . . unequivocal [and highly divergent] policy verdicts on the basis of ambiguous evidence" (p. 175). On their reading, cherry-picking is not just for caricatured, cynical politicians, but for scholars operating in good faith as well. To step slightly beyond their analysis, and to echo Stevens (2011), it may not be possible to make sense of an extensive and ambiguous literature without such selectivity.

Discussion and Conclusions

Research utilization is a complex, multidimensional, and heterogeneous phenomenon, and present understanding of it is incomplete. While the recent

research utilization and evidence-based policy literatures are extensive, the journal-based literature focused specifically on public policy or public administration utilization of academic social science research is not. Below we offer eight recommendations for future inquiry based upon our assessment of the literature. The first four recommendations address weaknesses of the existing literature, while the remainder discuss topics which we believe have been insufficiently studied.

Recommendation 1: Improvement and Greater Consistency in Measures of Research Use

Most articles that attempt to measure research utilization in our dataset rely upon scholar or practitioner self-report. These measures require that scholars and practitioners recall discrete instances of research use. Such recollections are likely to miss significant components of Weiss's (1979) "conceptual" use, where research subtly, indirectly, and often in the aggregate affects policy ideas and discourse over time. Recollection-based measures may also be sensitive to false positives when practitioners incorrectly attribute their actions to research; and false negatives, when scholars are simply unaware of some uses of their research or practitioners downplay or forget the influence of research. Last, there are no standard use measures in currency. The unrealistically linear and direct Knott and Wildavsky (1980) use process is the closest thing to a standard use measure in currency, and it, as discussed above, is likely to be primarily sensitive to instrumental and perhaps to symbolic use. Variation in phrasing and framing of use measures limits comparability of results across studies. Citation analyses, meanwhile, similarly elide conceptual use, while also struggling to identify differences between different degrees and varieties of research influence in policy.

It is difficult to envision an area of measurement with as much to gain from application of multiple methods and measures. These might include, for example, multitrait-multimethod matrices (e.g., Campbell & Fiske, 1959; Schmitt & Stults, 1986) or systematic triangulation (Caillaud et al., 2019). One obviously useful approach to measurement would be development of measures based on convergence of dyads. Most measures are self-reports by practitioners or by researchers, but not by both, much less by both parties responding to the same instances of use. We recognize that report of both practitioners and researchers on the same use instances would be difficult to achieve, but not impossible. For example, leadership studies in management and industrial psychology have for many years established the viability of methods based on not only dyadic approaches but also on networks of interacting respondents (e.g., Dansereau, 1995; Sheehan et al., 2020; Vecchio, 1982).

As research use in public affairs is a broad and heterogeneous construct, it is understandable and necessary that many different measures should be used. Given the difficulty of tracing the often subtle and indirect pathways by which research affects policymaking and public administration, primary reliance upon self-report is understandable as well. We do not think it too much, however, for authors to be clearer and more explicit about the extent and limits of the conceptualizations and measures of use that they employ. Ideally, greater consistency in measurement could also ease intercomparison between studies.

Recommendation 2: Greater Alignment on Constructs

Given the scope and complexity of research utilization and the underdeveloped status of supporting theory, it is understandable that the topic has not been boiled down to a small set of relevant constructs. Nonetheless, as discussed in reference to use measures, it would be useful to achieve some greater standardization of constructs of interest and associated measures to facilitate cross-comparison within the literature. Some surveys, for example, address demographic characteristics of scholars and practitioners; others do not. Some conceptualize adaptation of research to user needs in the framing of research, others to the presentation of findings, and still others do not specify at all. It is not necessary, desirable, or even possible, in such a complex and heterogeneous space, that every study address every potentially relevant construct. However, the development of a reasonably well-defined and shared lexicon of constructs which studies could address would be very useful. This review provides such a shared lexicon for the recent literature, though to be effective it will need to be adopted, expanded, and modified with continuing research.

In research on complex systems and phenomena, there is significant danger of "looking under the lamppost"—that is, that a major determinant of the findings of research will be scholars' adventitious choices about the framing and focus of research. A clearer framework laying out the overall landscape of research and the place of each individual study within it could assist in coordinating and relating different inquiries. It could also help to more clearly illustrate the limitations of any individual study. Figures 1 and 2, and Tables 2 and 4, which display the different constructs investigated in the literature, provide overall frameworks of this sort.

Recommendation 3: Greater Address of Different National, Geographic, Cultural, and Economic Contexts

A robust understanding of knowledge utilization generally, and of its particularities in different cultural, political, economic, and organizational contexts,

requires a spread of studies across different locales, levels of government, and scales of analysis. The present literature does a fairly good job of studying many different levels of government—for example, municipal, regional, and national—at different levels of granularity. But, as discussed above, nearly 90% of articles in our review study researchers or government organizations in Canada, Australia, the United Kingdom, or the United States. These studies can likely offer only limited insight about research use in other industrialized democracies, and still less about other, non-industrialized nations or non-democracies. The structures of governments and university systems, as well as broader cultural norms regarding the role of scholars and research in government, vary significantly across national contexts (O'Brien, 2005; Pattyn et al., 2022).

For example, U.S. government invocation of research frequently takes place through open adversary proceedings, while German government more frequently invokes closed, corporatist consultation (Jasanoff, 2005). The United States is relatively unique in its extensive system of private nonprofit universities, giving it an unusual research production landscape. Differences like these could plausibly drive differences in incidence, modes, mechanisms, and effects of academic research use in government across national contexts (and the many cultural, geographic, economic, and political differences subsumed within such). Improved understanding of how differences in context affect research utilization could help, for example, to identify what lessons and use mechanisms are and are not likely to easily transfer across contexts.

Recommendation 4: More Focused Research on Mechanisms of Scholar-Practitioner Interchange

The literature reveals a wide variety of mechanisms by which scholars and policymakers connect and communicate but treats them mostly in passing. Yet one of the most frequently appearing findings in the reviewed articles is that modes of scholar-practitioner relations matter for research utilization. A recent survey of ours finds communication between scholars and practitioners about research at any time before, during, or after research to associate positively with use (Bozeman et al. 2021, 2023). There is a fair amount of practical wisdom available on scholar-practitioner collaborations (e.g., Broström & McKelvey, 2018; Fletcher et al., 2018; Janousek & Blair, 2018; Pizmony-Levy et al., 2021; Ranchod & Vas, 2019; Woolcott et al., 2020; Yu, 2020), but these are far from the only or the primary mechanism of research uptake. We know the methods by which scholar-practitioner interchange occurs, but not how heavily or effectively each is used or their relative advantages and pathologies.

Bozeman et al. (2019) observe that scholars and policymakers alike get most of their research information not directly from journal articles, but curated by National Academies committees, policy analysts, think tanks, lobbyists, journalists, and social media influencers, among others. Anyone who takes seriously the thesis that new communication technologies have made significant contributions to the epistemic destabilization of the public sphere (Allcott & Gentzkow, 2017; Cinelli et al., 2021) cannot presume that the infrastructures of communication between scholars and policymakers are marginal to research utilization. Indeed, such mechanisms may be more mutable than are the entrenched cultures and circumstances of academic and policy institutions. Thus improved knowledge on this topic may be more actionable than, for example, further evidence that academic incentive systems are not oriented toward utilization.

Recommendation 5: Incorporate Relevant Studies of the Psychology of Information Choice and Decision-Making

Public officials searching for research information relevant to their policy decision-making are not enormously different from ordinary citizens. Policymakers' mix of motives resemble those of other information seekers: curiosity, self-validation, validation of choices already made, and information about possible solutions to pressing problems. Thus, it is odd that the knowledge use literature has so often ignored the abundant literature, chiefly in psychology, pertaining to information search and cognitive processing of information. Were research use scholars to focus on this relevant literature, they would find that much of it useful for some of their questions. Examples of questions of interest to both psychologists and knowledge utilization scholars include: "how do proximity and acquaintance affect the search for knowledge?" (e.g., Dunning et al., 2014; Monge et al., 1985; Schutte & Light, 1978), "how does one weigh risk and uncertainty in the application of knowledge?" (Johnson & Busemeyer, 2010; Kahneman et al., 1982; Milburn & Billings, 1976), and "how do one's biases affect judgments about information?" (Kareev, 1995; Ramirez & Erickson, 2014; West et al., 2012).

Similarly, it may well prove useful to return to older questions about information use, especially Simon's (1956, 1972) research on bounded rationality and satisficing, as well as the many variants pursued (chiefly by psychologists, not public administration scholars) since Simon's pioneering work (e.g., Campitelli & Gobet, 2010; Gigerenzer, 2010; Schwartz et al., 2011). While we would not yet go so far as to require that knowledge use scholars provide a defense as to just how their specific findings differ from the more general findings of cognitive psychology, we would urge some thought on how to situate research use studies within this more general context.

Recommendation 6: Seek Better Understanding of Differences in Knowledge Utilization Across Academic Fields and User Types

There are many different sorts of "knowledge utilization," ranging from use of physical science in industry for product and process innovation to use of social science for policymaking. Government, private industry, and nongovernmental organizations all make use of research from many different fields of study. Each sector of user has its own distinctive use processes and characteristics, and each academic field of study has its own institutional, methodological, and even epistemological idiosyncrasies. Yet research on knowledge utilization often focuses on one kind of academic and one kind of user, or lumps all knowledge utilization together, leaving knowledge about differences across types of academics and types of users scant (for notable exceptions, see Cherney et al., 2013; Matthews et al., 2018; Ouimet et al., 2010).

Scholars of knowledge utilization tend to focus on the flows of knowledge from scientists to industry (e.g., Perkmann et al., 2013, 2021). The industry context will likely prove quite different from the public policy and public administration context. Many industry users of academic scientific research focus on product development. This does not necessarily imply that the research sought must quickly be converted to commercial products. Frontiers research and pre-commercial research can prove useful to industry (Feller & Roessner, 1995; Feller et al., 2002; Van Looy et al., 2006), especially to large, stable firms with considerable scientific and technical capacity of their own (Akcigit et al., 2021; Audretsch & Acs, 1991). Nonetheless, firms hope to use knowledge for profit. This aim can require types of knowledge quite different from what is needed to achieve policy or social objectives. Research clients differ, knowledge sought differs, and the mechanisms of transfer differ, with private users often focused on protection of intellectual property through patent and royalty rights. These issues are not common in social science or public policy applications of research.

Identifying differences among these different sorts of use will prove a formidable task. Many have noted the characteristic differences in methods and research procedures across academic fields (Ellis et al., 1993; Palmer & Cragin, 2009; Vakkari, 2005). These differences begin early in research careers (Lodahl & Gordon, 1973; Whitmire, 2002). However, differences in research processes themselves may prove less important than differences in the nature of users and uses.

Given these obvious differences, why is comparison important? In the first place, if we are interested in developing theory, it is important to understand the domain of theory and its practical limits. Does one seek a general theory

of knowledge utilization, a theory that is discipline- or sector-based, or one that is even more contingent? Second, "best practices" could conceivably emerge, practices that could possibly be transferred among disciplines and discipline groups. We know, for example, that knowledge vetting methods, such as the practices of research journals, vary greatly by academic disciplines and discipline groups. If we find that some practices promote effective utilization in one sector or in one field of inquiry, then perhaps they can do so in another.

Recommendation 7: More Inquiry on Outcomes and Value of Research Utilization

It is now over 40 years since Lindblom and Cohen (1979) called for research to address what is to count as success or failure in social science impact, but—as our review illustrates—impact studies still mostly report different degrees of influence and presume that more is better. There is an almost total paucity of empirical investigation of not only the extent and varieties but also the worth of academic research contributions to policymaking and public administration on different sorts of problems. Where, when, and how is practice improved by research utilization, and where not?

Empirical, and especially quantitative, studies tend to take for granted that research utilization is good in itself. But any policy scholar or politico would acknowledge that many activities presented as knowledge utilization in policy are ineffective or outright harmful. Examples of theoretically backed policy with undesirable outcomes can be found to suit any political persuasion. Some may deride the GDP-focused optimization and unrealistic assumptions of neoclassical economic theory, on the basis of which free-trade policies and deregulation have contributed to the outsourcing of jobs, the hollowing out of the American middle class, the production of a parasitic and unstable financial sector, and various harms to the environment (Mazzucato, 2018). Others will critique the dysfunctional commodity markets, absence of incentives for performance improvement and innovation, and dogmatic and counterproductive pursuit of efficiencies of scale resulting from Soviet efforts at centralized, rational planning of production. The failure of Brasilia, the rationally planned city, has become emblematic of the perils of high-modern planning aspirations (Scott, 1998). All this without discussion of outright cynicism in use of evidence or the political consequences of battle over the throne of objectivity.

Indeed, nearly every agenda advanced in mainstream politics invokes some evidence, theory, or expert opinion. Experts and evidence, it eventuates, may be found to support most any program of action. As a striking but

non-unique example, American political coalitions have spent decades accusing one another of peddling "junk science" and asserting their own as "sound science," culminating in the general recognition of divergence in epistemic communities recently labeled a "post-truth moment" (Jasanoff & Simmet, 2017). Attempts to resolve complex questions of value prioritization by appeal to scientific claims have simply moved value disputes into the language of science, with political actors incentivized to develop large and sophisticated rhetorical arsenals to undercut one another's knowledge claims (Sarewitz, 2011).

Some scholars suggest that decades of epistemic warfare have undercut the ability of the American state to produce and sustain "serviceable truths" broadly accepted across political communities. On such accounts, attempts to compel value consensus by the authority of science have simply eroded that authority (Hilgartner et al., 2021; Jasanoff & Simmet, 2017; see Nelson, 1974 for a prescient concern about this possibility). Sarewitz (2004) argues that societies must achieve a modicum of value consensus on a problem before scientific knowledge can usefully guide action or assist with resolution. The point is not that use of research in policymaking and public administration must be bad, but that its goods cannot be taken for granted. More research is needed to understand when, how, under what forms of relations, and via what mechanisms research utilization does and does not result in improved outcomes.

Recommendation 8: More Research on Types of Problems and Contextual Utilities of Research

A few reviewed studies (Andrews, 2017; Bogenschneider et al., 2019; Newman, 2011) suggest that there are different kinds of questions or problems in policymaking and public administration and that the uses and utilities of academic research vary across those problems. For these authors, the spectrum is largely one of politicization: on big-ticket questions involving significant value conflicts, ideology dominates (the reading of) evidence. Little addresses whether ideology might only dominate where evidence is, for practical purposes, ambiguous (compare Douglas & Wildavsky, 1983; Nelson, 1977). Indeed, the reasons for high or low politicization have not been investigated. Nor have other sorts of distinctions between different kinds of public problems.

Broader scholarship on science in politics has produced many useful distinctions, including between "wicked" and "tame" problems (Buchanan, 1992), areas of value consensus and of value dissensus (Pielke, 2007), and

"normal" (low stakes, low uncertainty) and "post-normal" (high stakes, high uncertainty) science (Funtowicz & Ravetz, 1993). Such research suggests that scientific knowledge is no substitute for political processes of value prioritization and negotiation; but must instead be a component of and contribution to such mechanisms. Meanwhile, when stakes are lower, phenomena are simpler and more domesticable, or values align—in other words, away from big-ticket political controversies and closer to the minute and prosaic workings of public organizations—scientific knowledge can take a more instrumental and determinative role in showing effective ways to achieve generally agreed-upon goals. And, of course, new knowledge may help to suggest previously unidentified policy options.

Such ideas have not, for the most part, been extended to empirical inquiries into policy and public administration use of academic social science. What kinds of academic knowledge are valuable at different points in policy processes? When can and cannot, or should and should not, academic research resolve disputes? We do not know. The use typologies treated above likely are not sufficiently attuned to the different political, rhetorical, and distributed-cognitive functions of research to frame useful answers, and a typology of problems will certainly be needed alongside a taxonomy of contributions. Genuine improvement of research utilization in this space requires a better account of what useful contributions, and where, scholars can hope to make in the first place.

The last 20 years of empirical research have revealed a significant amount about the nature and correlates of policy and public administration utilization of academic social science research and elaborated a wide variety of potential determinants. They have, furthermore, provided a useful body of reflections, case studies, and discussions of best practices upon which scholars and practitioners can draw for practical wisdom about research collaboration and use. Much, however, remains to be learned about the classes of mechanisms, overall effects, and contextual utilities of research utilization. We hope that future research will attend to these neglected areas to advance understanding and practice in the application of social science to public problems.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

ORCID iDs

John P. Nelson https://orcid.org/0000-0002-3010-2046
Barry Bozeman https://orcid.org/0000-0002-8084-3379

References

Akcigit, U., Hanley, D., & Serrano-Velarde, N. (2021). Back to basics: Basic research spillovers, innovation policy, and growth. *The Review of Economic Studies*, *88*(1), 1–43. https://doi.org/10.1093/restud/rdaa061

Allcott, H., & Gentzkow, M. (2017). Social media and fake news in the 2016 election. *Journal of Economic Perspectives*, *31*(2), 211–236. https://doi.org/10.1257/jep.31.2.211

Amara, N., Ouimet, M., & Landry, R. (2004). New evidence on instrumental, conceptual, and symbolic utilization of university research in government agencies. *Science Communication*, *26*(1), 75–106. https://doi.org/10.1177/1075547004267491

Andrews, L. (2017). How can we demonstrate the public value of evidence-based policy making when government ministers declare that the people 'have had enough of experts'? *Palgrave Communications*, *3*, 11. https://doi.org/10.1057/s41599-017-0013-4

Audretsch, D. B., & Acs, Z. J. (1991). Innovation and size at the firm level. *Southern Economic Journal*, *57*(3), 739–744. https://doi.org/10.2307/1059787

Avey, P. C., & Desch, M. C. (2014). What do policymakers want from us? Results of a survey of current and former senior national security decision makers. *International Studies Quarterly*, *58*(2), 227–246. https://doi.org/10.1111/isqu.12111

Barton, C. J., Wang, Q., Anderson, D. M., & Callow, D. A. (2021). Synchronizing the logic of inquiry with the logic of action: The case of urban climate policy. *Sustainability*, *13*(19), 10625. https://doi.org/10.3390/su131910625

Bédard, P. O., & Ouimet, M. (2012). Cognizance and consultation of randomized controlled trials among ministerial policy analysts. *Review of Policy Research*, *29*(5), 625–644. https://doi.org/10.1111/j.1541-1338.2012.00581.x

Bernard, R., Wutich, A., & Ryan, G. W. (2017). *Analyzing qualitative data* (2nd ed.). SAGE Publications.

Blake, S. C., & Ottoson, J. M. (2009). Knowledge utilization: Implications for evaluation. *New Directions for Evaluation*, *2009*(124), 21–34. https://doi.org/10.1002/ev.311

Boaz, A., & Pawson, R. (2005). The perilous road from evidence to policy: Five journeys compared. *Journal of Social Policy*, *34*(2), 175–194. https://doi.org/10.1017/s0047279404008530

Bogenschneider, K., Corbett, T. J., & Parrott, E. (2019). Realizing the promise of research in policymaking: Theoretical guidance grounded in policymaker perspectives. *Journal of Family Theory & Review*, *11*(1), 127–147. https://doi.org/10.1111/jftr.12310

Bozeman, B., Bretschneider, S., Lindsay, S., Didier, N. et al. (2021) *Practitioners' Use of Public Affairs Research: The Importance of Intentionality* (Working Paper Series No.21-017). Center for Organization Research and Design, Arizona State University.

Bozeman, B., Bretschneider, S., Lindsay, S. Nelson, J.P., & Didier N. (2023). Reports of practitioners' use of public affairs faculty published research. *Studies in Higher Education*, *48*(5), 719–732. https://doi.org/10.1080/03075079.2023.2184787

Bozeman, B., Fay, D., & Slade, C. P. (2013). Research collaboration in universities and academic entrepreneurship: The-state-of-the-art. *The Journal of Technology Transfer*, *38*, 1–67. https://doi.org/10.1007/s10961-012-9281-8

Bozeman, B., Youtie, J., Fukumoto, E., & Parker, M. (2019). When is science used in science policy? Examining the importance of scientific and technical information in national research council reports. *Review of Policy Research*, *36*(2), 262–289. https://doi.org/10.1111/ropr.12324

Broad, K. (2002). Producing and using climate forecasts: Bridging the supply and demand gap in climate forecast production and use. In M.H. Glantz (Ed.), *La Niña and its Impacts: Facts and Speculation* (pp. 246–271). United Nations University Press.

Broström, A., & McKelvey, M. (2018). Engaging experts: Science-policy interactions and the introduction of congestion charging in Stockholm. *Minerva*, *56*(2), 183–207. https://doi.org/10.1007/s11024-017-9331-3

Bruce, A., & O'Callaghan, K. (2016). Inside out: Knowledge brokering by short-term policy placements. *Evidence & Policy A Journal of Research Debate and Practice*, *12*(3), 363–380. https://doi.org/10.1332/174426416x14688669171927

Buchanan, R. (1992). Wicked problems in design thinking. *Design Issues*, *8*(2), 5–21. http://www.jstor.org/stable/1511637?origin=JSTOR-pdf

Bush, V. (1945). *Science the endless frontier, A report to the President*. United States Government Printing Office.

Caillaud, S., Doumergue, M., Préau, M., Haas, V., & Kalampalikis, N. (2019). The past and present of triangulation and social representations theory: A crossed history. *Qualitative Research in Psychology*, *16*(3), 375–391. https://doi.org/10.1080/14780887.2019.1605272

Campbell, D. T., & Fiske, D. W. (1959). Convergent and discriminant validation by the multitrait-multimethod matrix. *Psychological Bulletin*, *56*(2), 81–105. https://doi.org/10.1037/h0046016

Campitelli, G., & Gobet, F. (2010). Herbert Simon's decision-making approach: Investigation of cognitive processes in experts. *Review of General Psychology*, *14*(4), 354–364. https://doi.org/10.1037%2Fa0021256

Capano, G., & Malandrino, A. (2022). Mapping the use of knowledge in policymaking: Barriers and facilitators from a subjectivist perspective (1990–2020). *Policy Sciences*, *55*, 399–428. https://doi.org/10.1007/s11077-022-09468-0

Caplan, N. (1979). The two-communities theory and knowledge utilization. *American Behavioral Scientist*, *22*(3), 459–470. https://doi.org/10.1177/000276427902200308

Castillo, E., La Londe, P. G., Owens, S., Scott, J., DeBray, E., & Lubienski, C. (2021). E-advocacy in the information market: how social media platforms

distribute evidence on charter schools. *Urban Education*, *56*(4), 581–609. https://doi.org/10.1177/0042085920953885

Charles, G. (2021). Integrating research into policy sphere: Evidence from Tanzania. *Journal of Development Effectiveness*, *13*, 424–436. https://doi.org/10.1080/19439342.2021.1971738

Cherney, A., Head, B., Boreham, P., Povey, J., & Ferguson, M. (2012a). Perspectives of academic social scientists on knowledge transfer and research collaborations: A cross-sectional survey of Australian academics. *Evidence & Policy A Journal of Research Debate and Practice*, *8*(4), 433–453. https://doi.org/10.1332/174426412x660098

Cherney, A., Head, B., Boreham, P., Povey, J., & Ferguson, M. (2012b). What influences the utilisation of educational research by policy-makers and practitioners?: The perspectives of academic educational researchers. *International Journal of Educational Research*, *56*, 23–34. https://doi.org/10.1016/j.ijer.2012.08.001

Cherney, A., Head, B., Boreham, P., Povey, J., & Ferguson, M. (2013). Research utilization in the social sciences: A comparison of five academic disciplines in Australia. *Science Communication*, *35*(6), 780–809. https://doi.org/10.1177/1075547013491398

Cherney, A., Head, B., Povey, J., Ferguson, M., & Boreham, P. (2015). Use of academic social research by public officials: Exploring preferences and constraints that impact on research use. *Evidence & Policy A Journal of Research Debate and Practice*, *11*(2), 169–188. https://doi.org/10.1332/174426514x14138926450067

Cinelli, M., De Francisci Morales, G., Galeazzi, A., Quattrociocchi, W., & Starnini, M. (2021). The echo chamber effect on social media. *Proceedings of the National Academy of Sciences of the United States of America*, *118*(9), e2023301. https://doi.org/10.1073/pnas.2023301118

Cooper, A., & Ben, L. (2010). Some Canadian contributions to understanding knowledge mobilisation. *Evidence & Policy A Journal of Research Debate and Practice*, *6*(3), 351–369. https://doi.org/10.1332/174426410x524839

Dansereau, F. (1995). A dyadic approach to leadership: Creating and nurturing this approach under fire. *The Leadership Quarterly*, *6*(4), 479–490. https://doi.org/10.1016/1048-9843(95)90022-5

Desmarais, B. A., & Hird, J. A. (2014). Public policy's bibliography: The use of research in US regulatory impact analyses. *Regulation & Governance*, *8*(4), 497–510. https://doi.org/10.1111/rego.12041

Douglas, M., & Wildavsky, A. (1983). *Risk and Culture: An Essay on the selection of technological and Environmental Dangers*. University of California Press.

Dunning, D., Anderson, J. E., Schlösser, T., Ehlebracht, D., & Fetchenhauer, D. (2014). Trust at zero acquaintance: More a matter of respect than expectation of reward. *Journal of Personality and Social Psychology*, *107*(1), 122–141. https://doi.org/10.1037/a0036673

D'Este, P., Ramos-Vielba, I., Woolley, R., & Amara, N. (2018). How do researchers generate scientific and societal impacts? Toward an analytical and operational framework. *Science and Public Policy*, *45*(6), 752–763. https://doi.org/10.1093/scipol/scy023

Ellis, D., Cox, D., & Hall, K. (1993). A comparison of the information seeking patterns of researchers in the physical and social sciences. *Journal of Documentation*, *49*(4), 356–369. https://doi.org/10.1108/eb026919

Etomaru, I., Bisaso, R., & Nakayiwa-Mayega, F. (2022). Fostering knowledge translation in Africa's flagship universities: A case of Makerere University. *Higher Education Research & Development*, *41*, 1060–1074. https://doi.org/10.1080/07294360.2021.1887093

Ezrahi, Y. (1990). *The Descent of Icarus: Science and the transformation of contemporary democracy*. Harvard University Press.

Ezrahi, Y. (2004). Science and the political imagination in contemporary democracies. In S. Jasanoff (Ed.), *States of knowledge: The co-production of science and social order* (pp. 254–273). Routledge.

Ezrahi, Y. (2012). *Imagined democracies: Necessary political fictions*. Cambridge University Press.

Feller, I., Ailes, C. P., & Roessner, J. D. (2002). Impacts of research universities on technological innovation in industry: Evidence from engineering research centers. *Research Policy*, *31*, 457–474. https://doi.org/10.1016/s0048-7333(01)00119-6

Feller, I., & Roessner, J. D. (1995). What does industry expect from university partnerships? *Issues in Science and Technology*, *12*(1), 80–84.

Fletcher, M., Dimitratos, P., & Young, S. (2018). How can academic-policy collaboration be more effective? A stewardship approach to engaged scholarship in the case of SME internationalization. *Transnational Corporations*, *25*(1), 23–41. https://doi.org/10.18356/2e0185bc-en

Fotheringham, M., Gorter, T., & Badenhorst, A. (2021). Enhancing impact: A model for policy development research. *Policy Design and Practice*, *4*(3), 372–391. https://doi.org/10.1080/25741292.2021.1961377

French, R. D. (2018). Lessons from the evidence on evidence-based policy. *Canadian Public Administration*, *61*(3), 425–442. https://doi.org/10.1111/capa.12295

Funtowicz, S. O., & Ravetz, J. R. (1993). Science for the post-normal age. *Futures*, *25*(7), 739–755. https://doi.org/10.1016/0016-3287(93)90022-l

Gigerenzer, G. (2010). Moral satisficing: Rethinking moral behavior as bounded rationality. *Topics in Cognitive Science*, *2*(3), 528–554. https://doi.org/10.1111/j.1756-8765.2010.01094.x

Graffy, E. A. (2008). Meeting the challenges of policy-relevant science: Bridging theory and practice. *Public Administration Review*, *68*(6), 1087–1100. https://doi.org/10.1111/j.1540-6210.2008.00957.x

Guston, D. H. (2000). *Between politics and science: Assuring the integrity and productivity of research*. Cambridge University Press.

Head, B., Ferguson, M., Cherney, A., & Boreham, P. (2014). Are policy-makers interested in social research? Exploring the sources and uses of valued information among public servants in Australia. *Policy and Society*, *33*(2), 89–101. https://doi.org/10.1016/j.polsoc.2014.04.004

Head, B. (2016). Toward more "evidence-informed" policy making? *Public Administration Review*, *76*(3), 472–484. https://doi.org/10.1111/puar.12475

Heinrich, C. J., & Good, A. (2018). Research-informed practice improvements: exploring linkages between school district use of research evidence and educational outcomes over time. *School Effectiveness and School Improvement*, *29*(3), 418–445. https://doi.org/10.1080/09243453.2018.1445116

Hilgartner, S., Hurlbut, J. B., & Jasanoff, S. (2021). Was science on the ballot? *Science*, *371*(6532), 893–894. https://doi.org/10.1126/science.abf8762

Hinrichs-Krapels, S., Bailey, J., Boulding, H., Duffy, B., Hesketh, R., Kinloch, E., Pollitt, A., Rawlings, S., van Rij, A., Wilkinson, B., Pow, R., & Grant, J. (2020). Using policy labs as a process to bring evidence closer to public policymaking: A guide to one approach. *Palgrave Communications*, *6*, 101. https://doi.org/10.1057/s41599-020-0453-0

Ion, G., Stîngu, M., & Marin, E. (2019). How can researchers facilitate the utilisation of research by policy-makers and practitioners in education? *Research Papers in Education*, *34*(4), 483–498. https://doi.org/10.1080/02671522.2018.1452965

Jann, W., & Wegrich, K. (2007). Theories of the policy cycle. In F. Fischer, G. J. Miller, & M. S. Sidney (Eds.), *Handbook of Public Policy Analysis* (pp. 43–62). CRC Press.

Janousek, C. L., & Blair, R. (2018). Theory–practice exchange in local government management: Perspectives of practitioners and scholars. *The American Review of Public Administration*, *48*(7), 730–742. https://doi.org/10.1177/0275074017725597

Jasanoff, S. (1990). *The fifth branch: Science advisors as policymakers*. Harvard University Press.

Jasanoff, S. (2005). *Designs on nature: Science and democracy in Europe and the United States*. Princeton University Press.

Jasanoff, S. (2014). *Science and public reason*. Routledge.

Jasanoff, S., & Simmet, H. R. (2017). No funeral bells: Public reason in a 'post-truth' age. *Social Studies of Science*, *47*(5), 751–770. https://doi.org/10.1177%2F0306312717731936

Jennings, E. T., & Hall, J. L. (2012). Evidence-based practice and the use of information in state agency decision making. *Journal of Public Administration Research and Theory*, *22*(2), 245–266. https://doi.org/10.1093/jopart/mur040

Johnson, J. G., & Busemeyer, J. R. (2010). Decision making under risk and uncertainty. *Wiley Interdisciplinary Reviews Cognitive Science*, *1*(5), 736–749. https://doi.org/10.1002/wcs.76

Kahneman, D., Slovic, P., & Tversky, A. (Eds.). (1982). *Judgment under uncertainty: Heuristics and biases*. Cambridge University Press.

Kareev, Y. (1995). Positive bias in the perception of covariation. *Psychological Review*, *102*(3), 490–502. https://doi.org/10.1037/0033-295x.102.3.490

Kitagawa, F., & Lightowler, C. (2013). Knowledge exchange: A comparison of policies, strategies, and funding incentives in English and Scottish higher education. *Research Evaluation*, *22*(1), 1–14. https://doi.org/10.1093/reseval/rvs035

Kline, S. J. (1995). *Conceptual Foundations for multidisciplinary thinking*. Stanford University Press.

Knight, C., & Lightowler, C. (2010). Reflections of 'knowledge exchange professionals' in the social sciences: Emerging opportunities and challenges for university-based

knowledge brokers. *Evidence & Policy A Journal of Research Debate and Practice*, *6*(4), 543–556. https://doi.org/10.1332/174426410x535891

Knott, J., & Wildavsky, A. (1980). If dissemination is the solution, what is the problem? *Knowledge*, *1*(4), 537–578. https://doi.org/10.1177%2F107554708 00010040410.1177/107554708000100404

Landry, R., Lamari, M., & Amara, N. (2003). The extent and determinants of the utilization of university research in government agencies. *Public Administration Review*, *63*(2), 192–205. https://doi.org/10.1111/1540-6210.00279

Landry, R., Amara, N., & Lamari, M. (2001). Climbing the ladder of research utilization: Evidence from social science research. *Science Communication*, *22*(4), 396–422. https://doi.org/10.1177%2F1075547001022004003

Lightowler, C., & Knight, C. (2013). Sustaining knowledge exchange and research impact in the social sciences and humanities: Investing in knowledge broker roles in UK universities. *Evidence & Policy A Journal of Research Debate and Practice*, *9*(3), 317–334. https://doi.org/10.1332/174426413x662644

Lindblom, C. E., & Cohen, D. K. (1979). *Usable knowledge: Social science and social problem solving*. Yale University Press.

Lingard, B. (2013). The impact of research on education policy in an era of evidence-based policy. *Critical Studies in Education*, *54*(2), 113–131. https://doi.org/10.1 080/17508487.2013.781515

Lodahl, J. B., & Gordon, G. (1973). Differences between physical and social sciences in university graduate departments. *Research in Higher Education*, *1*(3), 191–213. https://www.jstor.org/stable/40194654

Logan, J. O., & Graham, I. D. (1998). Toward a comprehensive interdisciplinary model of health care research use. *Science Communication*, *20*(2), 227–246. https://doi.org/10.1177%2F1075547098020002004

Martín-Martín, A., Orduna-Malea, E., Thelwall, M., & Delgado López-Cózar, E. (2018). Google Scholar, Web of Science, and Scopus: A systematic comparison of citations in 252 subject categories. *Journal of Informetrics*, *12*(4), 1160–1177. https://doi.org/10.1016/j.joi.2018.09.002

Matthews, P., Rutherfoord, R., Connelly, S., Richardson, L., Durose, C., & Vanderhoven, D. (2018). Everyday stories of impact: Interpreting knowledge exchange in the contemporary university. *Evidence & Policy A Journal of Research Debate and Practice*, *14*(04), 665–682. https://doi.org/10.1332/1744 26417x14982110094140

Mazzucato, M. (2018). *The value of everything: Making and taking in the global economy*. PublicAffairs.

McNally, R., & Alborz, A. (2004). Developing methods for systematic reviewing in health services delivery and organization: An example from a review of access to health care for people with learning disabilities. Part 1. Identifying the literature. *Health Information and Libraries Journal*, *21*(3), 182–192. https://doi.org/10.1111/j.1471-1842.2004.00512.x

Meagher, L., Lyall, C., & Nutley, S. (2008). Flows of knowledge, expertise and influence: A method for assessing policy and practice impacts from social science research. *Research Evaluation*, *17*(3), 163–173. https://doi.org/10.3152/095820208x331720

Milburn, T. W., & Billings, R. S. (1976). Decision-making perspectives from psychology: Dealing with risk and uncertainty. *American Behavioral Scientist*, *20*(1), 111–126. https://doi.org/10.1177/000276427602000107

Miles, M., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook* (2nd ed.). SAGE Publications.

Monge, P. R., Rothman, L. W., Eisenberg, E. M., Miller, K. I., & Kirste, K. K. (1985). The dynamics of organizational proximity. *Management Science*, *31*(9), 1129–1141. https://doi.org/10.1287/mnsc.31.9.1129

Mooney, C. (2005). *The Republican war on science*. Basic Books.

National Academy of Sciences, National Academy of Engineering, and Institute of Medicine. (2007). *Rising above the Gathering Storm: Energizing and employing America for a brighter economic future*. The National Academies Press.

Nelson, R. R. (1974). Intellectualizing about the Moon-Ghetto metaphor: A study of the current malaise of rational analysis of social problems. *Policy Sciences*, *5*(4), 375–414. https://doi.org/10.1007/bf00147227

Nelson, R. R. (1977). *The Moon and the Ghetto: An essay on public policy analysis*. W.W. Norton & Company.

Nelson, R. R. (2011). The Moon and the Ghetto revisited. *Science and Public Policy*, *38*(9), 681–690. https://doi.org/10.1093/scipol/38.9.681

Newman, J. (2011). Boundary troubles: Working the academic–policy interface. *Policy and Politics*, *39*(4), 473–484. https://doi.org/10.1332/030557310x550150

Newman, J. (2014). Revisiting the "two communities" metaphor of research utilisation. *International Journal of Public Sector Management*, *27*(7), 614–627. https://doi.org/10.1108/ijpsm-04-2014-0056

Newman, J. (2017). Deconstructing the debate over evidence-based policy. *Critical Policy Studies*, *11*(2), 211–226. https://doi.org/10.1080/19460171.2016.1224724

Newman, J. (2020). Increasing the ability of government agencies to undertake evidence-informed policymaking. *Evidence Base*, *2020*, 1–9. https://doi.org/10.21307/eb-2020-005

Newman, J., Cherney, A., & Head, B. W. (2016). Do policy makers use academic research? reexamining the "two communities" theory of research utilization. *Public Administration Review*, *76*(1), 24–32. https://doi.org/10.1111/puar.12464

Newman, J., Cherney, A., & Head, B. W. (2017). Policy capacity and evidence-based policy in the public service. *Public Management Review*, *19*(2), 157–174. https://doi.org/10.1080/14719037.2016.1148191

O'Brien, D. (2005). University—Government policy linkages and the knowledge-based approach to internation development. *Canadian Journal of Development Studies/Revue canadienne d'études du développement*, *26*(1), 131–150. https://doi.org/10.1080/02255189.2005.9669029

Oreskes, N., & Conway, E. M. (2010). *Merchants of doubt: How a handful of scientists obscured the truth on issues from tobacco smoke to global warming*. Bloomsbury Press.

Orr, K., & Bennett, M. (2012). Public administration scholarship and the politics of coproducing academic-practitioner research. *Public Administration Review*, *72*(4), 487–495. https://doi.org/10.1111/j.1540-6210.2011.02522.x

Ouimet, M., Bédard, P. O., Turgeon, J., Lavis, J. N., Gélineau, F., Gagnon, F., & Dallaire, C. (2010). Correlates of consulting research evidence among policy analysts in government ministries: A cross-sectional survey. *Evidence & Policy A Journal of Research Debate and Practice*, *6*(4), 433–460. https://doi.org/10.1332/174426410x535846

Palmer, C. L., & Cragin, M. H. (2009). Scholarship and disciplinary practices. *Annual Review of Information Science and Technology*, *42*, 163–212.

Paris, R. (2011). Ordering the world: Academic research and policymaking on fragile states. *International Studies Review*, *13*(1), 58–71. https://doi.org/10.1111/j.1468-2486.2010.00998.x

Pattyn, V., Blum, S., Fobé, E., Pekar-Milicevic, M., & Brans, M. (2022). Academic policy advice in consensus-seeking countries: The cases of Belgium and Germany. *International Review of Administrative Sciences*, *88*, 26–42. https://doi.org/10.1177/0020852319878780

Perkmann, M., Salandra, R., Tartari, V., McKelvey, M., & Hughes, A. (2021). Academic engagement: A review of the literature 2011-2019. *Research Policy*, *50*, e104114. https://doi.org/10.1016/j.respol.2020.104114

Perkmann, M., Tartari, V., McKelvey, M., Autio, E., Brostrom, A., D'Este, P., Fini, R., Geuna, A., Grimaldi, R., Hughes, A., Kitson, M., Krabel, S., Llerena, P., Lissoni, F., Salter, A., & Sobrero, M. (2013). Academic engagement and Commercialization: A review of the literature on university-industry relations. *Research Policy*, *42*, 426–442. https://doi.org/10.2139/ssrn.2088253

Petrescu, C., & Lambru, M. (2021). Using evidence in shaping disability policy in Romania: The case of sheltered workshops. *Evidence & Policy A Journal of Research Debate and Practice*, *17*(2), 243–260. https://doi.org/10.1332/174426421x16146970604672

Phipps, D. J., & Shapson, S. (2009). Knowledge mobilisation builds local research collaborations for social innovation. *Evidence & Policy A Journal of Research Debate and Practice*, *5*(3), 211–227. https://doi.org/10.1332/174426409x463767

Phoenix, J. H., Atkinson, L. G., & Baker, H. (2019). Creating and communicating social research for policymakers in government. *Palgrave Communications*, *5*(1), 98. https://doi.org/10.1057/s41599-019-0310-1

Pielke, R. A. (1999). Who decides? Forecasts and responsibilities in the 1997 Red River flood. *Applied Behavioral Science Review*, *7*(2), 83–101. https://doi.org/10.1016/s1068-8595(00)80012-4

Pielke, R. A., Jr. (2007). *The honest broker: Making Sense of science in policy and politics*. Cambridge University Press.

Pizmony-Levy, O., McDermott, M., & Copeland, T. T. (2021). Improving ESE policy through research-practice partnerships: Reflections and analysis from New York City. *Environmental Education Research*, *27*(4), 595–613. https://doi.org/10.1080/13504622.2021.1890696

Porter, T. M. (1995). *Trust in numbers: The pursuit of objectivity in science and public life*. Princeton University Press.

Price, D. K. (1965). *The scientific estate*. Harvard University Press.

Ramirez, M. D., & Erickson, N. (2014). Partisan bias and information discounting in economic judgments. *Political Psychology*, *35*(3), 401–415. http://www.jstor.org/stable/43783743

Ranchod, R., & Vas, C. (2019). Policy networks revisited: Creating a researcher–policymaker community. *Evidence & Policy A Journal of Research Debate and Practice*, *15*(1), 31–47. https://doi.org/10.1332/174426417x15139342679329

Rayner, S., & Sarewitz, D. (2021). Policy-making in the post-truth world: On the limits of science and the rise of inappropriate expertise. *The Breakthrough Journal*, *13*, 15–43. https://s3.us-east-2.amazonaws.com/uploads.thebreakthrough.org/Journal-Winter-Issue-13_2021_Policy-Making-in-a-Post-Truth-World.pdf

Rose, D. C., Kenny, C., Hobbs, A., & Tyler, C. (2020). Improving the use of evidence in legislatures: The case of the UK Parliament. *Evidence & Policy A Journal of Research Debate and Practice*, *16*(4), 619–638. https://doi.org/10.1332/174426420x15828100394351

Sá, C. M., Li, S. X., & Faubert, B. (2011). Faculties of education and institutional strategies for knowledge mobilization: An exploratory study. *Higher Education*, *61*(5), 501–512. https://doi.org/10.1007/s10734-010-9344-4

Sanni, M., Oluwatope, O., Adeyeye, A., & Egbetokun, A. (2016). Evaluation of the quality of science, technology and innovation advice available to lawmakers in Nigeria. *Palgrave Communications*, *2*, 16095. https://doi.org/10.1057/palcomms.2016.95

Sarewitz, D. (2004). How science makes environmental controversies worse. *Environmental Science & Policy*, *7*(5), 385–403. https://doi.org/10.1016/j.envsci.2004.06.001

Sarewitz, D. (2011). Does climate change knowledge really matter? *WIREs Climate Change*, *2*, 475–481. https://doi.org/10.1002/wcc.126

Sarewitz, D., Foladori G., Invernizzi, N., & Garfinkel, M.S. (2004). Science policy in its social context. *Philosophy Today*, *48S*, 67–83. https://doi.org/10.5840/philtoday200448Supplement8

Schmitt, N., & Stults, D. M. (1986). Methodology review: Analysis of multitrait-multimethod matrices. *Applied Psychological Measurement*, *10*(1), 1–22. https://doi.org/10.1177%2F014662168601000101

Schutte, J. G., & Light, J. M. (1978). The relative importance of proximity and status for friendship choices in social hierarchies. *Social Psychology*, *41*, 260–264. https://doi.org/10.2307/3033563

Schwartz, B., Ben-Haim, Y., & Dacso, C. (2011). What makes a good decision? Robust satisficing as a normative standard of rational decision making. *Journal for the Theory of Social Behaviour*, *41*(2), 209–227. https://doi.org/10.1111/j.1468-5914.2010.00450.x

Scott-Findlay, S., & Golden-Biddle, K. (2005). Understanding how organizational culture shapes research use. *JONA: The Journal of Nursing Administration*, *35*(7), 359–365. https://doi.org/10.1097/00005110-200507000-00008

Scott, J. C. (1998). *Seeing like a state: How certain schemes to improve the human condition have failed*. Yale University Press.

Sheehan, M., Garavan, T. N., & Morley, M. J. (2020). Transformational leadership and work unit innovation: A dyadic two-wave investigation. *Journal of Business Research*, *109*, 399–412. https://doi.org/10.1016/j.jbusres.2019.10.072

Simon, H. A. (1956). Rational choice and the structure of the environment. *Psychological Review*, *63*(2), 129–138. https://doi.org/10.1037/h0042769

Simon, H. A. (1971). Designing organizations for an information-rich world. In M. Greenberger (Ed.), *Computers, communications, and the Public Interest* (pp. 38–72). The Johns Hopkins University Press.

Simon, H. A. (1972). Theories of bounded rationality. *Decision and Organization*, *1*(1), 161–176.

Simon, H. A. (1983). *Reason in human affairs*. Stanford University Press.

Simon, H. A. (2019 [1996]). Social planning: Designing the evolving artifact. In *The sciences of the artificial* (3rd ed., pp. 139–167). The MIT Press.

Stevens, A. (2011). Telling policy stories: An ethnographic study of the use of evidence in policy-making in the UK. *Journal of Social Policy*, *40*(2), 237–255. https://doi.org/10.1017/s0047279410000723

Stokes, D. E. (1997). *Pasteur's Quadrant: Basic Science and Technological Innovation*. Brookings Institution Press.

Sullivan, H. (2011). Truth' junkies: Using evaluation in UK public policy. *Policy and Politics*, *39*(4), 499–512. https://doi.org/10.1332/030557311x574216

Thomas, R., & Ormerod, N. (2017). The (almost) imperceptible impact of tourism research on policy and practice. *Tourism Management*, *62*, 379–389. https://doi.org/10.1016/j.tourman.2017.02.009

Tilbury, C., Bigby, C., Fisher, M., & Hughes, M. (2021). Australian social work research: An empirical study of engagement and impact. *British Journal of Social Work*, *51*(2), 752–771. https://doi.org/10.1093/bjsw/bcaa170

Vakkari, P. (2005). Task-based information searching. *Annual Review of Information Science and Technology*, *37*, 413–464. https://doi.org/10.1002/aris.1440370110

Van Looy, B., Callaert, J., & Debackere, K. (2006). Publication and patent behavior of academic researchers: Conflicting, reinforcing or merely co-existing? *Research Policy*, *35*(4), 596–608. https://doi.org/10.1016/j.respol.2006.02.003

Vecchio, R. P. (1982). A further test of leadership effects due to between-group variation and within-group variation. *Journal of Applied Psychology*, *67*(2), 200–208. https://doi.org/10.1037/0021-9010.67.2.200

Vilkins, S., & Grant, W. J. (2017). Types of evidence cited in Australian Government publications. *Scientometrics*, *113*(3), 1681–1695. https://doi.org/10.1007/s11192-017-2544-2

Walker, L. A., Lawrence, N. S., Chambers, C. D., Wood, M., Barnett, J., Durrant, H., Pike, L., O'Grady, G., Bestmann, S., & Kythreotis, A. P. (2019). Supporting evidence-informed policy and scrutiny: A consultation of UK research professionals. *PLoS One*, *14*(3), e0214136. https://doi.org/10.1371/journal.pone.0214136

Walker, R. M., Chandra, Y., Zhang, J., & Witteloostuijn, A. (2019). Topic modeling the Research-Practice gap in public administration. *Public Administration Review*, *79*(6), 931–937. https://doi.org/10.1111/puar.13095

Weiss, C. H. (1979). The many meanings of research utilization. *Public Administration Review*, *39*(5), 426–431. https://doi.org/10.2307/3109916

Weiss, C. H. (1991). Policy research: Data, ideas, or arguments? In P. Wagner, C. H. Weiss, B. Wittrock, & H. Wollman (Eds.), *Social Sciences and modern states: National experiences and theoretical crossroads* (pp. 307–332). Cambridge University Press.

Weiss-Gal, I., Gal, J., & Schwartz-Tayri, T. M. (2017). Teacher, researcher and . . . policy actor? Social work academics' involvement in social policy. *Social Policy and Administration*, *51*(5), 776–795. https://doi.org/10.1111/spol.12196

West, R. F., Meserve, R. J., & Stanovich, K. E. (2012). Cognitive sophistication does not attenuate the bias blind spot. *Journal of Personality and Social Psychology*, *103*(3), 506–519. https://doi.org/10.1037/a0028857

Whitmire, E. (2002). Disciplinary differences and undergraduates' information-seeking behavior. *Journal of the American Society for Information Science and Technology*, *53*(8), 631–638. https://doi.org/10.1002/asi.10123

Wildavsky, A. (1983). Information as an organizational problem. *Journal of Management Studies*, *20*(1), 29–40. https://doi.org/10.1111/j.1467-6486.1983.tb00196.x

Wilkinson, H., Gallagher, M., & Smith, M. (2012). A collaborative approach to defining the usefulness of impact: Lessons from a knowledge exchange project involving academics and social work practitioners. *Evidence & Policy A Journal of Research Debate and Practice*, *8*(3), 311–327. https://doi.org/10.1332/174426412x654040

Wohlin, C. (2014). *Guidelines for snowballing in systematic literature studies and a replication in software engineering* [Conference session]. Proceedings of the 18th International Conference on Evaluation and Assessment in Software Engineering. https://dl.acm.org/doi/pdf/10.1145/2601248.2601268?casa_token=w3q_CdpmNwgAAAAA:jQIVxTog7j8eR7ETVCGzIXBphbTHfizzxTC4DccTeEPMe_N8tScMH94VpQaofKJsVeLmqlzEkomGbA.

Woolcott, G., Keast, R., & Pickernell, D. (2020). Deep Impact: Re-conceptualising university research impact using human cultural accumulation theory. *Studies in Higher Education*, *45*(6), 1197–1216. https://doi.org/10.1080/03075079.2019.1594179

Yingling, D. L., & Mallinson, D. J. (2020). Explaining variation in evidence-based policy making in the American States. *Evidence & Policy A Journal of Research Debate and Practice*, *16*(4), 579–596. https://doi.org/10.1332/174426419x15752577942927

Youtie, J., Bozeman, B., Jabbehdari, S., & Kao, A. (2017). Credibility and use of scientific and technical information in policy making: An Analysis of the information bases of the National Research Council's Committee reports. *Research Policy*, *46*(1), 108–120. https://doi.org/10.1016/j.respol.2016.11.001

Yu, H. H. (2020). Effective academic–practitioner collaboration on gender research in federal law enforcement: The value of a coproduction process. *International Review of Administrative Sciences*, *86*(3), 567–581. https://doi.org/10.1177/0020852318801499

Author Biographies

John P. Nelson is a doctoral candidate and National Science Foundation Graduate Research Fellow at Arizona State University's School for the Future of Innovation in Society. His research interests include differences in problem-solving processes across fields of physical and social science, the governance of emerging technologies, and the organization of research and innovation to serve public needs and values.

Spencer Lindsay is a doctoral student in Public Administration and Policy at Arizona State University's Watts College of Public Service and Community Solutions. In addition to policy knowledge utilization, his research interests include administrative law, and national security policy.

Barry Bozeman is Regents' Professor Emeritus and Arizona Centennial Professor of Technology Policy and Public Management, Arizona State University. His work focuses on public management, organization theory and science and technology policy. His most recent book, written with Michael Crow, is *Public Values Leadership* (Johns Hopkins University Press, 2021).