

Information use in public administration and policy decision-making: A research synthesis

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Abstract

This article presents a research synthesis of 162 studies focusing on information use for decision-making in public administration, management, and policy. The findings reveal that a significant proportion of work is centered around performance management and policy implementation. Notably, around one third of the reviewed studies adopt a behavioral science perspective. The analysis predominantly includes civil servants and citizens as the subjects, with quantitative studies outnumbering qualitative investigations by more than twofold. We identify three distinct components in understanding information use: the objective features of information architecture; the subjective mechanisms involving cognitive biases (i.e., over-/under-reaction to irrelevant information features) and decision noise (i.e., heterogeneity); and the moderating role of information user typology. Context should also be taken into account. The article explores how these findings relate to current societal challenges and emphasizes the potential of mixed-methods, multisample, and/or multisite research in advancing knowledge in this area.

Evidence for practice

- Navigating information use for decision-making in public administration, management, and policy is pivotal given the pressure to adopt interventions that work and the rapid growth in computational capacity.
- Going beyond the actual fragmentation in the understanding of information use in public decision-making requires distinguishing objective features of information, subjective mechanisms of information use, and the moderating role of user characteristics, while also taking context into account.
- If information use is influenced by behavior, we should broaden our concerns to include information technology, encompassing data collection, analysis systems, and the transformation of data into usable information.

INTRODUCTION

With increasing emphasis on big data, frequent admonition to follow the science, and a heightened attention to evidence-based practice, there is renewed need to ask how is information used to make decisions in the context of public administration? What factors shape the kinds of information individuals seek, and how do they weigh information from different sources? Thinking ahead, will we need to reexamine our understanding with the advent of new technologies, such as artificial intelligence, that

are capable of aggregating and analyzing vast quantities of data in a way that will reshape information use in public decisions? The literature on information use in public policy and administration is deeply fragmented, and consequently its application is varied and its meaning context-dependent. While our adoption of the term “information use” may carry certain connotations for different subsets of that literature, that is, purposeful information use from the performance management literature (Kroll, 2015a; Mikkelsen et al., 2023), we characterize the term more broadly in order to capture its role in a variety

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of decision architectures and unique conceptualizations across our field (which is to say, including, but not limited to, performance management). Further, our research synthesis specifically explores cognitive biases.

Recent studies provide prescriptive approaches to evidence-based and best practice integration (Hall & Jennings, 2008; Head, 2008; Newcomer et al., 2023); others have endeavored to produce a descriptive foundation of differences that exist across geographies and organizations (Jennings & Hall, 2012). The behavioral movement brings with it the use of experimental methodologies that examine the effects of cognitive bias on the presentation, processing, and use of information, which have well established the human capacity to succumb unwittingly to errors of judgment in making decisions. But the behavioral perspective has only recently entered the sphere of academic inquiry related to public decision makers' use of varied types of information. Stated differently, the kinds of information available to decision makers are now more varied and considerably more sophisticated. We are beginning to crack open the shell of independent components in information use, which necessitates we look more closely at how and when information is used with an eye toward how behavioral approaches might impact such decisions (Grimmelikhuijsen et al., 2017).

This study takes a broad look at information use in public sector decision-making, including policy making, administrative choices, management and practice, by analyzing articles that contain at least one of the following keywords in the title: information, decision, use, or data. By conducting a synthesis of the literature, we explore the fundamental constructs that underpin the information use in public administration and policy. Particularly salient to our understanding of this body of knowledge is the variety and scope of research methodologies employed to understand information use. Hendren et al. (2018) point out the potential for a positive quantitative bias to crowd out qualitative studies that seek to drill down to an individual, organizational, or decision-level understanding of the cognitive factors at work in information processing and use. We are particularly attentive to work that employs a behavioral perspective, utilizing constructs related to errors in judgment in the form of cognitive biases (Bellé et al., 2018). We report on several characteristics of the state of the art of scholarly understanding of information use in public administration and policy decision-making, so as to pinpoint its main independent components and distill three key recommendations for the advancement of knowledge for theory and practice alike.

THEORETICAL FRAMEWORK

Information is an essential component of decision-making, and consequentially, an integral component of public policy implementation and public management.

Simon's (1947) work reveals that we curtail information search by satisficing, rather than optimizing outcomes. Lindblom's (1959) theory of incrementalism, or successive limited comparisons, builds a framework of policy change based on limited information seeking, or rather, information seeking only at the margin. Fast forward half a century, and we find ourselves inundated with new applications for big data, fueled by rapid growth in technological capacity and a performance movement that values collecting data to inform management (Andersen & Moynihan, 2016; Desmidt & Meyfrootd, 2023; Kroll, 2015a; Mikkelsen et al., 2022; Moynihan, 2015; Pandey, 2015; Vogel & Hattke, 2018). Since the turn of the millennium, the policy making elite have developed a new infatuation with science, calling for increased use of evidence to inform policy decisions at nearly every turn. Following the increasing sophistication of the electorate, and their attention to science as an answer to difficult questions from climate change to criminal justice, politicians have intensified their own admonition to follow the science. The result is an evidence movement spawned out of desire to replicate for other areas of policy and practice what experimental results have been able to achieve with pharmaceutical schedules. This movement has been referred to somewhat flippantly as "evidence-based everything" (Hall, 2021). And finally, a concomitant movement in behavioralism, and behavioral public administration in particular, has begun to enhance our focus on the flaws in our information search, processing, and consequentially our decisions, as a result of cognitive biases and errors in judgment (Battaglio et al., 2019; Grimmelikhuijsen et al., 2017).

Information plays a central role in public decisions, both policy making and management, breaching both realms at key junctures. In the 75 years since Simon's (1947) work, we have come to understand most decisions in terms of whether or not they are intuitive or rational, and when rational, to what extent the information search is attenuated by satisficing. Information and its use are ubiquitous to public management, but we have not, as researchers, carved out an overt focus on information, per se. The advent of machine learning and artificial intelligence is raising new concerns about the manner in which information is used to influence decisions (Grimmelikhuijsen, 2023; Hartmann & Wenzelburger, 2021). There is growing concern that information may be manipulated at various stages of the decision process to achieve preconceived goals. Evidence itself has come under attack; President Trump famously forbade the use of the term "evidence-based" in agency budget requests (Hall and Battaglio 2018). The symbolic use of evidence rather than the substantive use for improved outcomes is a real concern (Hall, 2017). In this environment, the value of information—valid and reliable information—is at a premium. We need to take stock of the existing knowledge in our field through a systematic understanding of how information is treated in public administration research; doing so will enable us to identify the gaps and weaknesses

that decision makers will face as they move forward in this rapidly changing environment.

Attention to information is not new; scholars have been concerned with how information enters various decision processes in the public sphere through both policy and management. If we take these two broad classifications, we see two distinct sets of theory building around the use of information in policy design and implementation. Naturally, such division is myopic and neglects the central flaws of the politics versus administration dichotomy. It is impossible to eliminate the effects of politics on implementation. And, as Pandey and colleagues note, policy making continues through implementation at the street level (Pandey, Cheng, and Hall 2022). Nonetheless, for conceptual circumspectness and clarity, the two-pronged approach is the way the field has developed. In public management, the focus on information grew with the performance movement, but the prominence of information use in that subfield neglects its important roles throughout other dimensions of practice and research. We are concerned with collecting information, comparing information, and from a management perspective, examining how it has been used (Grossi et al., 2016; Kroll, 2015c; Vogel & Hattke, 2018).

The literature on information use is scattered and fragmented, with conceptual attention developing within unique silos (e.g., performance management, decision science, policy formulation, evidence-based practice). For example, Dimitrijevska-Markoski and Edward French (2019) examine the factors that influence managers' use of performance information in Florida, finding that institutionalization and adequacy of the system design play measurably into information use. Li (2023) has shown that mandatory performance information disclosure has led to increased environmental inspections. Boer et al. (2018) show that disclosure of performance information influences bureaucrats' enforcement style. Kroll (2013) suggests that managers explore not only systematic quantitative information in making decisions, but that they also receive and process considerable amounts of nonroutine information, primarily from organizational insiders and relevant external stakeholders.

Baekgaard and Serritzlew (2016) prompt us with the notion that performance information might be examined for comprehension or interpreted through motivated reasoning. They find, in fact, that decision makers systematically interpret performance information in ways that conform to their prior beliefs. Relatedly, Mikkelsen et al. (2022) find that the internal use of information is higher when data show a declining performance and the external use of information is higher when data show an improving performance. Belardinelli et al. (2018) examine whether the type of performance information use and the request to justify decisions affect the manner in which information is processed. Through survey experiments, their findings reveal that managers process performance information differently under *ex post* versus *ex ante* uses;

managers are more likely to be subject to framing bias under *ex post* conditions. A recent literature review on the use that scholars make of data collected through the Federal Employee Viewpoint Survey signals that the field of human resource management is not absent in this domain (Somers, 2018). These studies only scratch the surface of the information use literature. What is clear, however, is that it continues to be a central concern of management studies; there is a growing behavioral interest in the topic; that information use in this context is conceptually amorphous; and the science is growing increasingly sophisticated over time.

On the policy side of the house, the role of information in shaping and influencing support for policy proposals has been of keen interest since the beginning of policy theory itself. Incrementalism or the successive limited comparisons approach introduced by Lindblom is an explanation for the limited information seeking that takes place in making policy decisions. The counterpart, the rational comprehensive model, is presented as an infeasible waste of time, digging up information on every possible alternative, evaluating its likely effectiveness, and making purely rational decisions. Baumgartner and Jones' (1993) punctuated equilibrium theory unifies the approaches to explain how information is used in a limited fashion when change is incremental, but more extensively when a problem reaches crisis stage. Workman et al. (2009) draw on these advances to lay out a broad theory of government information processing that integrates the study of agenda setting, policy dynamics, and information flows in the policy process, and relate it to core features of American government as inter-institutional dynamics and delegation within the policy process. Recent effort to systematize knowledge has focused on the use of data to foster social equity (Ruijter et al., 2023). All this is to say, simply, that agendas are influenced by information, and subsequent information is used to evaluate and advocate for different policy alternatives. A desire to know the effects of such policies has fueled efforts in policy analysis and evaluation, and these serve as the fodder for the evidence movement.

The recent evidence-based movement is rooted in rationality, seeking to use scientific information in particular to guide policy decisions. As Head (2016) notes, even though public agencies gather and process tremendous amounts of information, there has been scant analysis of how such information is actually utilized for policy and program improvement. Head (2016) has previously pointed out that scientific information, such as evaluation findings, must compete with other kinds of information, including political wisdom about what is acceptable and administrative wisdom about what is technically feasible. It is important, also, that we seek to better understand information use so as to disentangle these complexities. Newcomer et al. (2023) examine one clearinghouse of evidence-based approaches and find that the variety of information considered in making program classifications

and rankings is woefully insufficient in its failure to integrate facts about context, and its failure to break down impact in ways that promote social equity. In any evidence-based endeavor, considerable variation will be observed as there are differences in motivation to seek information, varying levels of information availability, and information from professional and other sources about what works and what does not. Notably for our present interest, Newcomer et al. (2023) makes a point of noting that selection bias may be “limiting our knowledge of what works and where” (1057).

Information seeking during the policy process does not take place in a sterile setting; it is not immune from politics. Hansen (2023), for example, examines whether performance information affects the political agenda. His results show that performance shortfalls receive political attention, regardless of the politicization of the environment, which counters an extensive literature suggesting political context alters attention to performance information. In other words, political entities use performance data to focus attention on problem areas. Even budget policy has revealed that information shapes outcomes in important ways (Demaj, 2017). Information processing as part of the policy process has been the subject of considerable theorizing, and information plays prominently into the framing of issues and policy alternatives.

While information use is clearly important, it is also clear that its study is, at best, bifurcated, and at worst deeply fragmented. We seek to bring organization and understanding to this literature at this crucial time in order to fuel stronger theorization and conceptual development that bridges the policy and management divide, that reveals the array of methodological approaches to its study, and that reveals the extent to which behavioral approaches have begun to influence theories of information use and influence.

Engaging a topic as broad and fragmented as this—information use—for a research focus poses certain hazards. Taking a novel approach to the construct, such as our explicit examination of behavioral concerns, complicates that considerably. In particular, we lack as a starting point any clear theoretical framework to guide the formulation of testable hypotheses in a traditional deductive manner. To that end, our work can be characterized as both exploratory and inductive, seeking to build theory and understanding from fragments of seemingly unconnected evidence scattered throughout the literature. Much like factor analysis seeks to define the dimensionality of a dataset, our efforts here seek to define the conceptual dimensionality of an otherwise broad and amorphous construct, information use. Our purpose can be best understood as being derived from an epistemological foundation tied to a generative purpose, potentially constrained by the application of previous typologies/frameworks. This effort was inspired largely by the call to open up new avenues of knowledge and understanding through a reimagination or rethinking of

the silos into which we have previously divided our work. As Alvesson and Sandberg (2020) note in their counterpoint to Elsbach and Van Knippenberg’s argument for integrative reviews, “in contrast to the integrative review, which regards reviews as a ‘building exercise’, the problematizing review regards reviews as an ‘opening up exercise’ that enables researchers to imagine how to rethink existing literature in ways that generate new and ‘better’ ways of thinking about specific phenomena” (1290). Others have made a strong case for a problematizing approach to literature synthesis to counter overly narrow conceptualizations of key phenomena (Strader et al., 2023).

RESEARCH DESIGN

Adopting Breslin and Gatrell’s (2023) metaphor of a miner-pro prospector continuum focused on the degree to which a literature review project aspires to develop a new theory, our research qualifies mostly as a miner-like effort that reaches the middle of the spectrum and heads toward being a prospector. In fact, our approach spans from spotting conceptual gaps, organizing and problematizing findings up to transferring theories across domains. This last component is trackable in the special focus dedicated to articles that adopt a behavioral science perspective.

Inspired by searching criteria adopted in recent research syntheses in public administration scholarship (Andersen et al., 2016; Battaglio et al., 2019; George et al., 2021; Pandey et al., 2023), we defined the set of journals to search for primary studies by considering those outlets that are simultaneously ranked among the top 20 in the ISI Thomson Public Administration list and in the Public Policy and Administration Google Scholar Metrics list. At the time of our search (i.e., February 2023), the most updated rankings corresponded to 2021 and January 2023, respectively. The rationale behind this journal selection process is twofold. On the one hand, the fact that a journal is included simultaneously in two rankings that are independent one from the other—instead of being listed in any of the two rankings alone—signals its general relevance for the discipline. Considering the overlap between two independent lists might serve as a methodological advancement compared with existing research syntheses in public administration that have relied on a single ranking (e.g., Andersen et al., 2016; Battaglio et al., 2019). On the other hand, as both lists include blind peer-reviewed journals only, any articles published in such journals would have gone through peer-review processes aimed at maximizing theoretical soundness and empirical rigor. All in all, our procedure for the selection of journals diminishes the probability that we are ignoring relevant trends in the literature devoted to understanding the use of information in public administration and policy decision-making. Based on these criteria, the journals of reference for our research synthesis

are the following 14 (in alphabetical order): Administration & Society; Governance; Journal of Public Administration Research and Theory; Policy & Politics; Policy and Society; Policy Sciences; Policy Studies Journal; Public Administration; Public Administration Review; Public Management Review; Public Money & Management; Regulation & Governance; Review of Public Personnel Administration; and The American Review of Public Administration. In developing our research string, we focused our keywords on our core research interest: the use of information for decision-making. The two fundamental components of information use and decision-making form the heart of our research endeavor. As a result, keywords like “information,” “use,” and “decision” naturally emerged. To minimize the risk of false-negative instances, we chose to avoid combinations of these keywords, such as “information use.” Additionally, we included the term “data” to complement “information,” recognizing that these two concepts might sometimes be used interchangeably. To identify potentially relevant articles, we used the Scopus website and restricted our search to manuscripts (i) written in English, (ii) classified as “article” instead of other typologies of outputs, and (iii) that contained at least one of the words “information,” “decision,” “use,” or “data” in their title. Precisely, then, our query was as follows:

(TITLE (information) OR TITLE (decision) OR TITLE (use) OR TITLE (data)) AND (LIMIT-TO (EXACTSRCTITLE, “Public Administration Review”) OR LIMIT-TO (EXACTSRCTITLE, “Public Management Review”) OR LIMIT-TO (EXACTSRCTITLE, “Journal of Public Administration Research and Theory”) OR LIMIT-TO (EXACTSRCTITLE, “The American Review of Public Administration”) OR LIMIT-TO (EXACTSRCTITLE, “Policy and Society”) OR LIMIT-TO (EXACTSRCTITLE, “Policy Studies Journal”) OR LIMIT-TO (EXACTSRCTITLE, “Review of Public Personnel Administration”) OR LIMIT-TO (EXACTSRCTITLE, “Governance”) OR LIMIT-TO (EXACTSRCTITLE, “Public Administration”) OR LIMIT-TO (EXACTSRCTITLE, “Administration & Society”) OR LIMIT-TO (EXACTSRCTITLE, “Policy & Politics”) OR LIMIT-TO (EXACTSRCTITLE, “Policy Sciences”) OR LIMIT-TO (EXACTSRCTITLE, “Regulation & Governance”) OR LIMIT-TO (EXACTSRCTITLE, “Public Money & Management”)) AND (LIMIT-TO (LANGUAGE, “English”)) AND (LIMIT-TO (DOCTYPE, “ar”))

This process led to the identification of 413 primary studies. We retained all articles that focused on the use of information for making decisions. In other words, any research that explored the use of information to nurture decisions would meet our inclusion criteria. Conversely, studies lacking either an information use component or a focus on decision-making were excluded from our dataset. As an illustration, we excluded works solely concerned with information sharing if they were not relevant to information use and decision-making. To safeguard intercoder reliability, we began assigning 10 articles to two authors, who initially screened and coded studies independently. Afterwards, the two authors conferred to

ensure consistency in coding and discussed any mismatches at length until reaching agreement on the codebook and coding approaches. The remaining articles were divided randomly and each coded by one author. Each author cross-checked the coding of the other on a subset of articles. At a later stage, to further validate intercoder reliability, the same two authors jointly analyzed 44 additional articles. For each of the primary studies included in our final sample, we documented articles’ DOI, journal of publication, author(s), year of publication, research design, type of sample analyzed (if any), and geographic area of reference. Also, we classified primary studies along the following dimensions: public administration and policy topic, main feature of the use of information being investigated, and behavioral public administration framework (if any) and related psychological mechanism investigated. Figure 1 summarizes the process used for the selection of primary studies based on the standard and widely used PRISMA flow diagram (<http://prisma-statement.org/prismastatement/flowdiagram.aspx>).

RESEARCH FINDINGS

The in-depth analysis of primary studies that were retrieved based on our search criteria returned 162 articles on the use of information in public administration and policy decision-making. Results are reported in a series of tables, whose order mirrors the dimensions targeted by our review, namely topic, target feature of information, behavioral focus, sample, research design, and country. We further include a segmentation by decade in Tables 4 through 6 to enhance readability and elucidate the observed trends.

Table 1 provides a breakdown of the 162 articles by journal of publication and public administration and policy topic. As to the outlet, the vast majority of primary articles appear in Public Administration Review, which published about 28 percent of the entire sample of studies synthesized. About 16 percent of articles are published in Public Administration and 14 percent in Public Management Review. These top-three outlets are followed by the Journal of Public Administration Research and Theory, counting the publication of about 10 percent of the primary studies, Policy Sciences with about 8 percent of primary articles, and Policy Studies Journal and Governance with 6 percent each. Of the 14 journals that were included in our search strategy, two have not published any articles of interest for our work at this point. Those are Regulation & Governance and Public Money & Management. The remaining outlets published articles on the use of information to make decisions that account for a maximum of 4 percent and a minimum of 2 percent of the total.

Moving to the main topic investigated, the top two areas of research for the use of information in decisions are related to performance management (among the most

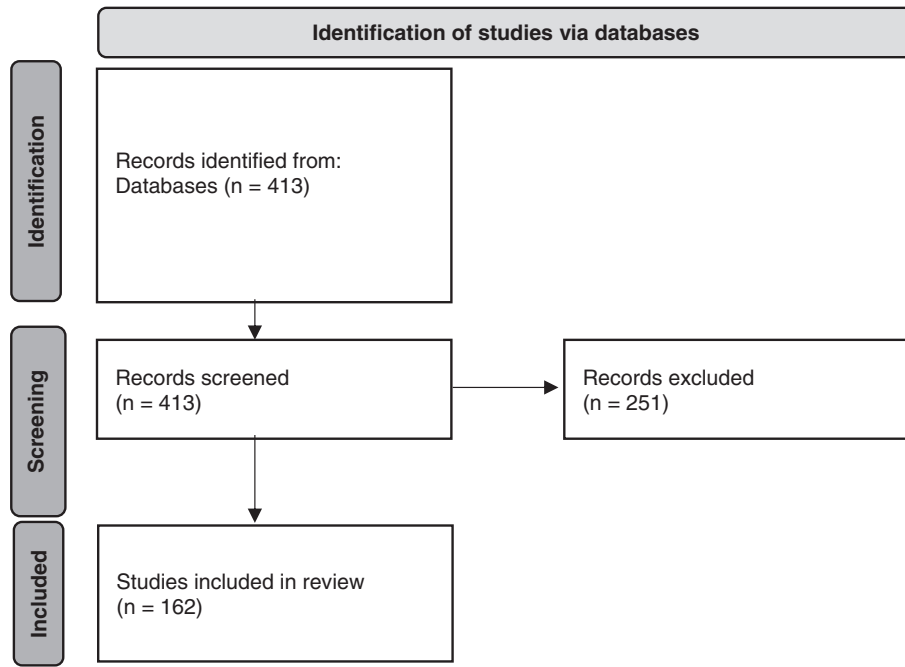


FIGURE 1 PRISMA 2020 flow diagram.

recent Choi & Woo, 2022; Christensen & James, 2022; Hansen & Nielsen, 2022; Lerusse & van de Walle, 2022a, 2022b; Meier et al., 2022; Mikkelsen et al., 2022) and policy making and implementation (among the most recent Chen & Greitens, 2022; DeLeo & Duarte, 2022; Ruijter et al., 2023; Shafran, 2022; Turner et al., 2022; Zhu et al., 2022). More precisely, the use of data in managing performance accounts for 28 percent of the total number of primary studies, equaling the use of data to design and implement public policies that also accounts for 28 percent of the sample. These topics are followed by investigations of the use of information for stakeholder governance (14 percent of the studies) (e.g., Funke et al., 2021; Jungblut & Jungblut, 2022; Meyfrootd & Desmidt, 2022; Solorio et al., 2023), budgeting and finance (11 percent) (e.g., Brunner et al., 2021; Linder Müller et al., 2022; van der Voet & Lems, 2022), and managing human resources (9 percent) (Hong & Kim, 2019; Petersen et al., 2019). The occurrence of each of the remainder of topics is less than 6 percent in the final sample. Nevertheless, a better understanding of these topics might well be on the rise in terms of both research and practice in the near future because of their relevance for today's societal challenges. These topics are related to the use of information to better understand the psychology of decision-making (5 percent) (e.g., Murat Yildirim 2020; Nowlin, 2021), to govern during public emergencies (3 percent) (e.g., Phillips et al., 2023; Wu et al., 2022), to account for the role of algorithmic decisions and artificial intelligence (1 percent) (Grimmelikhuisen, 2023; Hartmann & Wenzelburger, 2021), and the reduction of administrative burdens faced by citizens when interacting with

government organization or faced by civil servants while engaged in delivering public services (1 percent) (Linos et al., 2022). Overall, Public Administration Review seems to be the journal that has taken the lead in publishing research on the use of information to make decisions for both the most and least investigated topics.

Table 2 portrays the breakdown of our primary studies classified by the main feature of information being considered. A subgroup of studies is focused on one feature only, whereas other studies simultaneously investigate up to three features of the use of information. Generally speaking, the range of aspects that previous studies have explored to gain a better understanding of information use in decision-making in public administration and policy tend to be wide. In other words, the variability of key aspects of information being considered when data use is concerned is high, with just a handful of features recurring more frequently. The most frequent features being studied are: information content (19 studies focused on that feature alone, and 6 additional articles investigate content in conjunction with other information features) (e.g., Bel et al., 2021; Blom-Hansen et al., 2021; DeLeo & Duarte, 2022; Harrits, 2019; Hong & Kim, 2019; Mizrahi & Minchuk, 2020; Walker et al., 2018; Wang & Niu, 2020) and information purpose (18 studies) (e.g., Choi & Woo, 2022; George & Desmidt, 2018; Korac et al., 2020; Meyfrootd & Desmidt, 2021; Micheli & Pavlov, 2020; Nitzl et al., 2019; Ruijter et al., 2023; Tantardini, 2022), followed by evidence-based information (16 studies with exclusive focus and 1 study with an additional focus) (e.g., Hall & van Ryzin, 2019; Head, 2016; Petty et al., 2018; Turner et al., 2022; Wagner et al., 2021), information relativity

TABLE 1 Studies on the use of information in decision-making, by topic, by journal.

	Journal of public										N tot	% tot	
	Administration and society	Governance	Journal of public administration research and theory	Policy and politics	Policy and society	Policy sciences	Policy studies journal	Public administration review	Public management review	Review of public personnel administration			The American review of public administration
Performance management	2	2	3			1	11	15	10		2	46	28%
Policy making and implementation	3	6	1	1	3	8	8	5	4		1	45	28%
Stakeholder governance			4	1		2	3	7	3			22	14%
Budgeting and finance			4			1	3	8	2			18	11%
Human resource management	1		4			1	1	4		4		15	9%
Psychology of decision-making							2	2	3		1	8	5%
Emergency management		1						3	1			5	3%
Algorithmic decisions and Artificial intelligence						1		1				2	1%
Administrative burden													
N tot	6	9	16	2	3	13	26	46	23	4	4	162	
%	4%	6%	10%	1%	2%	8%	16%	28%	14%	2%	2%		

(16 studies) (e.g., George, Baekgaard, et al., 2020; Holm, 2017; Hong et al., 2020; Petersen et al., 2019; van der Voet & Lems, 2022), information availability (10 studies) (e.g., Boer et al., 2018; Wit & Bekkers, 2020), and framing of information (10 studies interested on framing alone and an additional study interested on its framing and purpose) (e.g., Belardinelli et al., 2018; Mikkelsen et al., 2022; Porumbescu et al., 2021).

Of the 162 primary studies synthesized in our work, 49 adopt a behavioral public administration approach. In other words, about 30 percent of the available public administration research on the use of information to make decisions applies insights from the broader social science to study how cognitive biases can impinge on decisions in public administration contexts. Of these studies, 16 illuminate our understanding of how the accessibility of information generates systematic patterns of deviations from rationality in choices (e.g., Demaj, 2017; Harrits, 2019; Roberts & Wernstedt, 2019), 8 explore loss aversion in decision-making (e.g., Bellé et al., 2018; James & Moseley, 2014), and 7 examine how framing effects have an impact on information use (e.g., Mikkelsen et al., 2022; van der Voet & Lems, 2022). These areas of behaviorally inspired inquiry are followed by others that examine bounded rationality (e.g., Walgrave & Dejaeghere, 2017), nudge theory (e.g., Esmark, 2019), confirmation bias (e.g., Christensen, 2018), and sector bias (e.g., Meier et al., 2022). Table 3 portrays the full range of behavioral mechanisms currently analyzed by public administration and policy scholarship devoted to better understand how information are used to make decisions.

Table 4 reports the distribution of studies by typology of sample unit analyzed (if any) and by decade in which the article was published. About 20 percent of the papers explore the use of information in decision-making among public managers exclusively (among the most recent Hansen & Nielsen, 2022; Hong & Kim, 2019; Lewandowski, 2019; Meyfroot & Desmidt, 2022), about 14 percent among citizens (among the most recent Christensen & James, 2022; Linos et al., 2022; Meier et al., 2022), 13 percent among public employees (among the most recent Choi & Woo, 2022; Dimitrijevska-Markoski & Edward French, 2019), 10 percent based on documents (among the most recent DeLeo & Duarte, 2022; Jungblut & Jungblut, 2022; Turner et al., 2022), 9 percent at an organizational level (e.g., Chen & Greitens, 2022; Phillips et al., 2023), 9 percent among elected officials (e.g., Meyfroot & Desmidt, 2021; van der Voet & Lems, 2022), 3 percent among students (e.g., Christensen, 2018; Marks & Gerrits, 2018), and 2 percent are based on big data (e.g., Giest, 2017; Lavertu, 2016). In about 11 percent of the cases, the classification by sample unit is not applicable because studies are not empirical (e.g., Giest & Samuels, 2020; Maor, 2020). Interestingly, the remainder of studies employ more than one sample, a trend that seems to be on the rise in the last decade (e.g., Lerusse & van de Walle, 2022a; Mosley & Gibson, 2017).

TABLE 2 Studies on the use of information in decision-making, by main feature(s) of information being studied.

	N tot
Asymmetry	1
Availability	10
Availability, relativity	1
Big data	2
Big data, purpose	1
Content	19
Content, evidence-based	1
Content, framing, source	1
Content, ownership, relativity	1
Content, quality, source	1
Content, quantity	1
Content, source	1
Directionality	1
Disclosure	1
Dissonance	6
Drawbacks	4
Drawbacks, quality	1
Evidence-based	16
Evidence-based, institutionalization	1
Format	3
Framing	10
Framing, purpose	1
Institutionalization	5
Institutionalization, publicness	1
Institutionalization, quality	1
Medium	3
Novelty, quality	1
Order	2
Ownership	1
Process	1
Publicness	2
Publicness, relativity	2
Purpose	18
Quality	6
Quality, purpose	2
Quality, quantity	2
Quality, source, relevance	1
Quantity	8
Relativity	16
Source	5
Transparency	1
N tot	162

As for the cross tabulation of studies by research design and by decade of publication (Table 5), about 28 percent of the primary studies adopt a quantitative cross-sectional approach (among the most recent Bel

TABLE 3 Studies on the use of information in decision-making, by behavioral mechanisms investigated (if any).

	N tot
Accessibility	11
Accessibility, framing	2
Accessibility, loss aversion	2
Accessibility, reference dependence	1
Anchoring, halo	1
Bounded rationality	4
Confirmation bias	3
Confirmation bias, sector bias	1
End effect	1
Framing	6
Framing, isomorphic pressures	1
Intuition vs. reasoning	1
Isomorphic pressures	1
Loss aversion	8
Nudging	3
Reference dependence	1
Sector bias	2
N tot	49

et al., 2021; Meyfroot & Desmidt, 2021, 2022; Wagner et al., 2021), 25 percent experimental designs with randomization procedures to assign participants to groups (among the most recent Christensen & James, 2022; Grimmelikhuisen, 2023; Hansen & Nielsen, 2022; Lindermüller et al., 2022), 20 percent qualitative analysis (among the most recent Jungblut & Jungblut, 2022; Phillips et al., 2023; Solorio et al., 2023; Zhu et al., 2022), 11 percent use a normative approach (e.g., Esmark, 2019; Isett & Hicks, 2018), 7 percent employs quantitative longitudinal analyses (e.g., Shafran, 2022; Wu et al., 2022), and 5 percent espouses mixed methods (e.g., DeLeo & Duarte, 2022; Head, 2016; Linos et al., 2022). Quantitative studies with a panel design (Hondula et al., 2018; Hong et al., 2020), research syntheses (Ruijter et al., 2023; Somers, 2018), and quantitative analyses based on administrative data (Hong & Kim, 2019) account for 1 percent each and appear for the first time in the last decade. The number of studies using randomized control trials or qualitative inquiries seems to be increasing for the current decade compared with the previous decade, whereas the adoption of mixed methods does not show evident patterns of rapid growth yet.

Of the 142 studies that specify the country setting (Table 6), the majority have been conducted in Europe (42 percent) (among the most recent Linos et al., 2022; Phillips et al., 2023) or North America (40 percent) (among the most recent Brunner et al., 2021; Meier et al., 2022). These are followed by work conducted in Asia (8 percent) (among the most recent Chen & Greitens, 2022; Zhu et al., 2022), multiple countries (6 percent) (among the

TABLE 4 Studies on information use in decision-making, by sample unit investigated (if any), by decade of publication.

	1980–89	1990–99	2000–09	2010–19	2020	N tot	%
Public managers		2	2	26	3	33	20%
Citizens		1	2	8	12	23	14%
Public employees	2		3	15	1	21	13%
N/A	1		3	11	3	18	11%
Documents		1	4	5	7	17	10%
Government organizations	1	1	3	4	6	15	9%
Elected officials		1	2	6	5	14	9%
Students		1		3	1	5	3%
Multiple—elected officials and public managers					4	4	2%
Multiple—public managers and employees		1	1	1	1	4	2%
Big data				3		3	2%
Multiple—elected officials and citizens	1					1	1%
Multiple—elected officials and students				1		1	1%
Multiple—elected officials, public managers, citizens				1		1	1%
Multiple—public and private employees					1	1	1%
Multiple—public employees and citizens					1	1	1%
N tot	5	8	20	84	45	162	
%	3%	5%	12%	52%	28%		

most recent Bel et al., 2021; Blom-Hansen et al., 2021), Australia (3 percent) (e.g., Head, 2016; Head et al., 2014), Africa (1 percent) (Funke et al., 2021), and South America (1 percent) (Avellaneda, 2013). Studies adopting a multi-country perspective or set in currently underrepresented continents seem to be on the rise.

As a robustness test for our methods and analyses, we applied our search and analysis to the journal *Public Performance & Management Review*, which did not meet the criteria for the inclusion of outlets at the time in which the research was conducted. Knowing that many journals consider our selected topics of interest, we strove to focus on those with the widest impact. Because research that emphasizes performance and the use of information in management decisions is not limited to the journals selected using our methodology, we believed it is necessary to determine whether expanding the search would adversely shape our findings. Its inclusion and possibly the inclusions of similar journals would have increased the number of analyzed studies without, however, changing the nature of findings and derivation of our framework.¹

¹As a robustness test for our methods and analyses, we applied our search and analysis to the journal *Public Performance & Management Review*. In other words, we applied the searching string and inclusion criteria that we previously adopted for all the other journals to a single journal that, albeit not meeting our outlet inclusion criteria, is potentially specialized on the study of information use in decision-making in the context of public administration. This search returned 44 articles published in *Public Performance & Management Review*. Of those, upon the screening of abstracts and full papers that two of the authors made jointly, 12 were deemed appropriate for inclusion in the study and were hence coded. As to the topic that these studies investigate, nine focus on performance management, two focus on budgeting and finance, and 1 focuses on stakeholder governance. The main feature(s) of information being studied are as follows:

Overall, our findings suggest that research into the use of information in public decision-making has focused on three independent components that can be summarized in one comprehensive framework. The first factor refers to objective features of the piece of information, with those features defining the information architecture. Information architects and users design and edit the context in which the objective information features are set. Examples of objective features of information, include, for instance, its content (Bozeman & Pandey, 2004); format—for instance, whether information is presented in a textual or visual form (Isett & Hicks, 2018); nature—for instance, whether it is routine or nonroutine (Tantardini, 2019); purpose—for instance, whether the aim for the usage is to assess past performance or make decisions for future interventions (Belardinelli et al., 2018) or benchmark (Ammons & Rivenbark, 2008); or source—for instance, whether the institution providing the information is public or private (Lerousse & van de Walle, 2022a). In short, information architecture encompasses objective features of information, which are inherently numerous and heterogeneous in nature.

content (4 studies), format (3), content and source (1), asymmetry (1), availability (1), purpose (1), and source (1). Among the 12 articles, only 4 adopt a behavioral perspective, with 2 studies looking at the mechanism of accessibility, 1 of bounded rationality, and 1 of reference dependence. All in all, the inclusion of *Public Performance & Management Review* and possibly similar journals would have increased the number of analyzed studies without, however, changing the nature of findings. In fact, the topics, target feature(s) of information, behavioral focus, sample, research design, and country of the 12 studies published in *Public Performance & Management Review* already emerged from the articles published in outlets that met our inclusion criteria.

TABLE 5 Studies on information use in decision-making, by research design and decade.

	1980–89	1990–99	2000–09	2010–19	2020	N tot	%
Quantitative—cross section	1	1	7	29	7	45	28%
Quantitative—randomized controlled trial	1	2		20	18	41	25%
Qualitative	2	3	7	12	9	33	20%
Normative	1		3	11	3	18	11%
Quantitative—longitudinal		2	2	4	4	12	7%
Mixed methods			1	5	2	8	5%
Quantitative—panel				1	1	2	1%
Research synthesis				1	1	2	1%
Quantitative—administrative data				1		1	1%
N tot	5	8	20	84	45	162	
%	3%	5%	12%	52%	28%		

TABLE 6 Studies on information use in decision-making, by country of data collection (if any).

	1980–89	1990–99	2000–09	2010–19	2020	N tot	%
Europe		1	4	36	19	60	42%
North America	3	6	10	27	11	57	40%
Asia				3	8	11	8%
Multiple	1		2	3	2	8	6%
Australia			1	3		4	3%
Africa					1	1	1%
South America				1		1	1%
N tot	4	7	17	73	41	142	
%	3%	5%	12%	51%	29%		

The second component of the parsimonious model of information use in public decision-making that our literature review isolates is related to the subjective mechanisms of the use of information that might trigger systematic cognitive biases or nurture variability in the form of decision noise. For example, keeping the objective features of information constant, different degrees of actual understanding, ease of recall, framing effects, or loss aversion may jump in (Belardinelli et al., 2018; Bellé et al., 2018; Olsen, 2017). Public administration and policy decisions are a prime example of mental operations called judgments (Kahneman et al., 2021). Kahneman et al. (2021) argue that “some judgments are biased; they are systematically off target. Other judgments are noisy, as people who are expected to agree end up at very different points around the target” (2021, 9). According to their reasoning, bias and noise are two independent components of overall error. Specifically, bias is the average of errors and noise is the variability of errors. When information users make decisions based on a given information architecture with certain objective features, subjective mechanisms might influence the likelihood that they will fall prey to systematic bias or that different individuals will opt for significantly different solutions in identical cases.

The third component of the framework speaks to the type of user as a variable that moderates the relationship between objective information features and subjective mechanisms of information use. Examples of different typologies of users include Econs versus Humans, machines versus humans, individuals with low versus high field expertise, or decision makers versus decision recipients. Figure 2 provides a graphical representation of this framework, in which the three components are mutually exclusive and should help organize future work for the advancement of our understanding of information use in public decision-making. As illustrated in Figure 2, our framework posits an interaction between objective features of information (i.e., information architecture) and type of information user on information use. Moreover, the interplay and dynamics among the three components are influenced by contextual factors, such as organizational culture (Andersen & Moynihan, 2016) or institutional features (George, Baekgaard, et al., 2020).

DISCUSSION

Our research synthesis aimed at fueling stronger theorizing and conceptual development in scholarly and

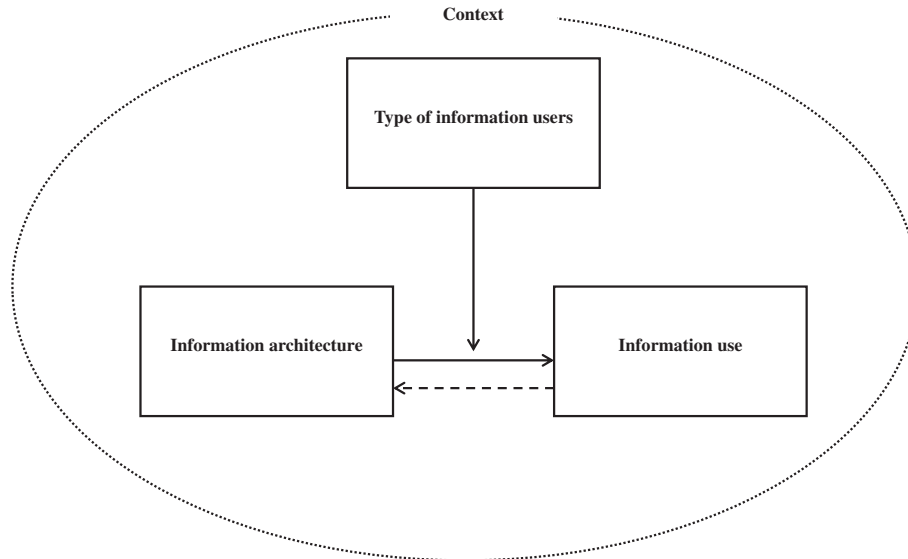


FIGURE 2 Independent components of information use in public administration and policy decision-making.

practical understanding of information use in public administration and policy decision-making. This is relevant to bridge the policy and management divide, uncover the array of methodological approaches to its study, and reveal the extent to which behavioral approaches might contribute to its advancement from the microlevel perspective. We did so by standing somewhere in between the miner-pro prospector continuum with an inductive and generative goal. Specifically, we spotted conceptual gaps, organized and problematized insights, and noted the transfer of theories across domains. This approach translated into the identification of three independent components of information use in public administration and policy decision-making. These components are the information architecture that entail objective features, the information use where the microlevel subjective mechanisms jump in, and the type of information users that can moderate the relationship between the two other variables. Additionally, contextual factors should be taken into account to investigate the interplay and dynamics among such components. These pave the way to the identification of a parsimonious list of recommendations, which we present and discuss below.

Our literature review indicates that the academic understanding of information use in core public policy and administration decision domains is not yet comprehensive. For instance, compared with other topics—most notably performance information (Choi & Woo, 2022; Christensen & James, 2022; Desmidt & Meyfrootd, 2023; Grøn & Kristiansen, 2022; Kroll, 2015c; Lerusse & van de Walle, 2022a, 2022b; Meier et al., 2022; Mikkelsen et al., 2022; Pandey, 2015; Tantardini, 2022; Vogel & Hattke, 2018)—scant research has so far focused on information use to manage unforeseen public emergencies (Bel et al., 2021; George, Verschuere, et al., 2020; Phillips

et al., 2023; Wu et al., 2022), to adopt artificial intelligence and algorithm-determined decisions in a way that take accounts of its promise and perils, and to reduce administrative burdens when citizens interact with government or civil servants interact with their institutions. This seems especially unfortunate considering Herbert Simon's recognition that "decision-making is at the heart of administration" (1947, xi). Our synthesis unveils that information use for decisions made under public emergencies has been explored in the context of tornado warning (Robinson et al., 2019) and the Covid-19 pandemic (Bel et al., 2021; George, Baekgaard, et al., 2020; George, Verschuere, et al., 2020; Phillips et al., 2023; Wu et al., 2022) focusing on consequential individuals' behaviors or benchmarking across governments.

As to the opportunity of letting artificial intelligence instead of human decision makers use information, few top-notch studies discuss how information produced by algorithms introduce the novel opportunity of statistical prediction for real-life situations (Hartmann & Wenzelburger, 2021) or whether and how access to and ease of understanding of automated algorithms have an impact on trust (Grimmelikhuisen, 2023). We anticipate and encourage an increase in the count of such studies in the coming years due to recent trends. To wit, the current accountability language of the policy elite emphasizes increased reliance on information through their admonition to follow the science, to engage in evidence-based practice, and to implement proven programs. As to the field of administrative burden, a randomized controlled trial in Greece demonstrates that reasonably up to date communication technologies may backfire and increase—rather than decrease—recipients' burdens of seeking information about free government services. Importantly, the negative impact is larger for the most disadvantaged segments of the population, that is, those

that the policy targets and aims at helping through a reduction in administrative burdens. To solicit information for free dental care services, in fact, participants were more likely to use traditional communication tools—in the form of a pre-paid postcard and a postcard requiring postage—than more modern tools—namely a hotline or email (Linos et al., 2022). Based on these elements, we formulate the following recommendation to advance research and practice into information use for public decision-making.

Recommendation 1. Strengthening research into evidence-based information use in public decision-making beyond the study of performance information

Furthermore, our research synthesis reveals a number of information features that can naturally connect two literature streams, namely the one that is concentrated on the use of information for public decision-making (Kroll, 2015a) to the one devoted to the application of behavioral science insights to public administration and policy challenges (Battaglio et al., 2019). In particular, features such as data availability, format, framing, purpose, or supporting evidence are variables that behavioral public administration scholars also study in depth because of their impact on judgment errors and decision variability (Ballard, 2020; Belle et al., 2022; Olsen, 2017). Even more telling for the establishment of a bridge between the two literature streams is the fact that about one third of the primary articles synthesized in our work explicitly employ a behavioral science lens to address information use issues. Behavioral public administration was decidedly formalized in our discipline less than a decade ago as the “interdisciplinary analysis of public administration from the microlevel perspective of individual behavior and attitudes by drawing on recent advances in our understanding of the underlying psychology and behavior of individuals and groups” (Grimmelikhuisen et al., 2017, 46). Afterward, a systematic review traced the origins of behavioral public administrator back to its roots (Battaglio et al., 2019) and a critical reflection isolated where the behavioral public administration is currently on track and where route adjustments might be needed (Bhanot & Linos, 2020). By integrating rational choice models for decision-making, a few decades of mainstream behavioral science research have revealed that decision makers tend to be prone to judgment error in the form of predictable deviation from rationality, the so-called cognitive biases (Kahneman, 2011). Alongside bias, the most recent developments in behavioral science work have theorized unwanted variability in decisions, the so-called noise (Kahneman et al., 2021). When studying judgment errors across fields, it is imperative to consider bias and noise simultaneously because they do not cancel out each other but rather add up. When a group of public managers make estimations that are similar though far away from the target, decisions are biased. When a group

of public managers make different decisions in the face of the same information, their judgments are subject to noise. Interestingly, both bias and noise can sometimes be reduced through nudges (Kahneman et al., 2021; Thaler and Sunstein 2021). Furthermore, cognitive biases and decision noise resonate with very recent research on over-/under-reaction to irrelevant information features and decision heterogeneity, respectively (Bordalo et al., 2023).

Overall, drawing on the full set of perspectives—which currently range from rational choice approaches to the study of departures from rationality in the form of bias and noise—might accelerate our understanding of information use in public administration and policy decision-making. The information architecture that determines objective information features might be informed by rationality, whereas the study of the use of information that different individuals make and their subjective mechanisms might leverage on predictable irrationality and unwanted variability. This investment might bring meaningful returns in balancing the import-export ratio of theories among disciplines (Breslin & Gatrell, 2023) and diminishing the time required to close the science-practice gap (Perry, 2012). Additionally, such an investment could easily connect nascent attempts to include both a microlevel perspective (e.g., Bjørnholt et al., 2016; Pfiffner, 2019; Rubin et al., 2023; Tantardini, 2022; Zhang et al., 2016) and contextual factors—such as social capital (Tantardini & Kroll, 2015)—into the analysis of information use in making decisions. Based on these insights, we formulate the following recommendation to advance the theorizing of information use for public decision-making.

Recommendation 2. Theorizing about the use of information in public decision-making should distinguish objective features of information, subjective mechanisms of information use, and user characteristics, while also taking context into account

The final reflection goes to the research designs and methods that, with regard to the state of the art, should drive future scholarly efforts dedicated to providing an overarching understanding of information use in public decision-making. Our synthesis of the literature unveils a prevalence of primary studies that employs a single method, sample, and site. Eight studies in our review adopted a mixed-methods approach, collecting data on a single sample in a single continent (e.g., Harrits, 2019; Linos et al., 2022; Newman et al., 2016). Two primary articles in our synthesis used multiple samples in different countries with a single method (Bellamy et al., 2008; Blom-Hansen et al., 2021). Randomized controlled trials are the gold standard for establishing the why in cause-and-effect relationship. In other words, randomized experiments are the most efficient tool to get an unbiased estimate of the impact of a deliberate treatment.

Compared with other designs and methodologies, they score higher on the internal validity of inference. Observational research is better suited to illuminate the micro-mechanisms behind an observed effect, thus providing indications about the how an outcome comes about. Observational research scores higher on external validity and can have a quantitative or a qualitative nature. In particular, qualitative methodologies appear to be the best candidates to get a deeper understanding of the mechanisms through which cause and effect sequences hold. In the words of Shadish et al. (2002), randomized controlled trials have a unique strength in providing a causal description—aka molar causation, that is, describing the consequences attributable to deliberately varying a treatment—and are less suited to giving causal explanations—aka as molecular causation, that is, clarifying the chain reactions through which and the conditions under which those causal relationships hold. The systematic triangulation of experimental results with insights from observational research through mixed methods and studies across samples and sites hold the promise of creating rigorous findings at an unprecedented pace (e.g., Hendren et al., 2018). Realizing this potential seems to be facilitated by technological advancements and international networks of scholars. Based on these considerations, we formulate the third recommendation below.

Recommendation 3. Time seems ripe to leverage on a diverse combination of mixed-methods, multisample, and/or multisite research designs to sustain the study of information use in public administration and policy decision-making

Our research synthesis is not immune to the same limitations that affect work of the same nature. Hence, findings and recommendations should be understood and used under this light. Most notably, a number of judgment calls were necessary to define the search algorithm, isolate the key variables to be coded, and the coding taxonomies. The choices were meant to establish a reasonable balance between relevance and feasibility. In the same vein, the criteria we adopted to select the top peer-reviewed journals included in our review may have inherent limitations, such as the exclusion of potentially relevant general or specialized publication outlets. At the same time, however, we are convinced that considering the journals listed both in the ISI Thomson Public Administration and in the Public Policy and Administration Google Scholar Metrics represents a methodological improvement compared with similar research syntheses that rely on a single list of top peer-reviewed journals (e.g., Andersen et al., 2016; Battaglio et al., 2019). Similar concerns may extend to the selection of keywords for the search of primary studies. In particular, future research could expand the scope of our synthesis to include additional

constructs. Another limitation that our synthesis shares with similar work is the inability of providing a precise number of disagreements between authors in coding articles because the review process happened in multiple stages, and we did not keep track of all disagreements as we moved from one stage to the next. This concern might especially apply to the classification of articles by topic where the breadth and depth of coding taxonomies is inherently difficult. The disclosure of such choices and the rule of full agreement among coder to move forward only work as a partial remedy to each judgment calls. Naturally, our inductive approach also carries inherent limitations, which we explicitly acknowledge. Allowing themes to emerge from the data without predefined typologies potentially threatens the ability to pinpoint a set of constructs that is collectively exhaustive to understand information use in decision-making. However, the adoption of an inductive rather than a deductive approach is linked to the absence of comprehensive theoretical frameworks that have the same focus and scope as our effort and is tied to the generative purpose of our endeavor. Certainly, future work that tests the validity of our components of information use in public administration and policy decision-making is needed.

CONCLUSION

By integrating information architecture, subjective mechanisms of information use, and a typology of information users, while also taking context into account, we capture the essence of the literature on information use in public policy and management decision-making. Doing so provides a stronger conceptual framework for those interested in studying evidence-based policy and practice, or the potential for inherent bias introduced by an information orientation. The concomitant rise in artificial intelligence and other mechanisms for rapidly aggregating and processing information suggests that developing this conceptual capacity is due, if not overdue. Collectively, the constructs shed light on where and why we might expect to encounter bias or noise in the decision-making process, and consequently offer guidance for developing novel theoretical and empirical work to study the role of information in decision-making. Likewise, our recommendations pinpoint the ongoing importance of inquiry in this area. To confront existing and emerging challenges requires that we understand how evidence-based information is used in public decisions. New theory and research on information must better distinguish and clarify the objective features of information, subjective attributes of its use, and the characteristics of its users to develop a full and complete accounting of information's role. And finally, we are at a point where all elements of research designs and methodologies will benefit from enhanced rigor and diversity.

All of this discussion of information use in decision-making is important, and it reveals how information use

may be biased, or subject to influence, in important policy and management decision settings. It is relevant to point out in conclusion that the application of our findings requires further broadening in today's age. Because managers are not just looking at facts on paper, information is increasingly subject to processing, aggregation, and manipulation. To the extent information use is subject to behavioral influences, our concerns must also be expanded to incorporate information technology, including the systems and processes used to collect and analyze data, converting it into useable information along the way. Information is power, and learning to better wield it will result in improvements to policy, implementation, and the public good.

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