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QUANTITATIVE METHODS IN PUBLIC ADMINISTRATION: THEIR USE AND DEVELOPMENT THROUGH TIME

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ABSTRACT: *This article aims to contribute to recent debates on research methods in public administration by examining the use of quantitative methods in public administration research. We analyzed 1,605 articles published between 2001–2010 in four leading journals:* Journal of Public Administration Research and Theory (JPART), Public Administration Review, Governance*, and* Public Administration (PA). *Results show that whereas qualitative methods are still predominant compared to quantitative methods (56% versus 44%), the field is becoming increasingly quantitative. Of quantitative methods used, surveys are most dominant, while a combination of methods is used far less often. In general, very few studies use a mixed methods design. As to the areas of research, we found that the use of quantitative methods is unequally distributed; some subfields (public management) use quantitative methods more often than others (policy and*

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*politics), and some journals (*JPART, PA*) publish articles on quantitative research more than others (*Governance*). Implications for public administration research are discussed.*

INTRODUCTION

Although observers of the state of the discipline in public administration differ widely in their time frame, scope, method and focus (see, e.g., Raadschelders 2011; Ricucci 2010; Kettl 1996; Rhodes 1995; Perry and Kraemer 1986), two conclusions almost always stand out. First, public administration is characterized by plurality, both of theories and topics as well as philosophical positions and research methods. And second, public administration research is methodologically underdeveloped, particularly in comparison to other disciplines. Regarding this last point, Gill and Meier (2000, 157) concluded that

> *[p]ublic administration research has fallen notably behind research in related fields in terms of methodological sophistication. This hinders the development of empirical investigations into substantive questions of interest to practitioners and academics.*

In particular, the use of advanced quantitative methods such as time series and the generalized linear model (GLM) was lagging behind, according to these authors. More recently, however, Perry (2012) wrote about the overuse of surveys and quantitative analysis in public administration, and suggested that scholars should use a more diversified approach, including more use of experiments and meta-analysis. This seems at odds with claims by Pollitt about the continuing dominance of case study research—often carried out in a "sloppy" manner (Pollitt 2006; 2013). In this article, we take stock to find out which of these claims is true, and to see whether public administration research has made a turn towards more quantitative research since 2000. To this end, we have analyzed the use of research methods of all articles published in four leading public administration journals between 2001–2010: *Journal of Public Administration Research and Theory* (*JPART*), *Governance, Public Administration Review* (*PAR*), and *Public Administration* (*PA*). These journals were selected as they are core public administration journals, consistently ranked among the top 10 journals during this time, and with a generic scope for research topics in public administration (Wright, Manigault, and Black 2004).

In our analysis, we will focus on three central questions. First, we will analyze *how much* quantitative research is being conducted in the field of public administration, and how this has developed over time. By taking a wide scope—10 years of research in four leading journals—we have a total population of 1,605 articles, hence we will be able to make solid conclusions about the use of quantitative methods, both over time and across journals. The first research question therefore is:

RQ1: To what extent have public administration scholars used quantitative research methods relative to qualitative research methods, and how has this developed over time?

Second, we will study the dominance of certain methods in quantitative public administration research, also across time. For instance, are surveys most often used, or do scholars analyze existing statistical data more often? The second research question reads:

RQ2: Which patterns, if any, exist regarding preferences or dominant methods when public administration scholars use quantitative methods?

Third, we aim to analyze which (sub)fields in public administration (policy and politics, network and complex governance, public management) and which journals are frequent users of quantitative methods, and which are not. Often stated assumptions—such as that policy studies often employ qualitative designs (O'Toole 2000)—can be tested in this way. Therefore the final research question is:

RQ3: Which subfields in public administration research are frequent users of quantitative methods and which subfields are not?

This brings us to the outline of the article. The next section will provide a background on quantitative research in public administration and related fields. We will also provide an overview of previous review studies on research methods in public administration and their findings so we can compare those with our own findings later on. In Section 3, we will outline the method for our analysis. Section 4 will discuss the results. In the last section, conclusions will be drawn, focusing especially on the methodological implications for public administration scholars and students.

QUANTITATIVE RESEARCH IN PUBLIC ADMINISTRATION

Arguments for Methodological Choices in Public Administration Research

Before exploring review studies on the use of quantitative methods, a short discussion is needed on arguments for particular methodological choices in public administration research. In any discipline, arguments for methodological choices depend partly on the research problem at hand and partly on the philosophical or paradigmatic preferences of the researcher. Given space limitations, and because it is not the main purpose of this article, we will not provide a full discussion of the philosophical and methodological issues at hand when choosing quantitative or qualitative methods. Interested readers may refer to general discussions in the social sciences about these issues (e.g., King, Keohane, and Verba 1994; Neuman 2005), or to scholars who focus on this debate in the public administration discipline (e.g., Haverland and Yanow 2012). Instead, we focus on a number of arguments for choosing either qualitative or quantitative methods used by public administration scholars. Drawing on Haverland and Yanow (2012), we use the term methods—referring to tools and techniques for research, such as surveys, interviews, and participation—and not the term methodology—referring to the ontological and epistemological positions that underpin a research question.

One important argument for choosing either qualitative or quantitative methods is the *unit of analysis*. Some research problems focus especially on human attitudes and behavior. Quantitative methods can be applied here relatively easily. Examples from the public administration discipline are work motivations of employees who join the civil service (Groeneveld, Steijn, and Van der Parre 2009) or the problems of civil servants with New Public Management (NPM) reforms and their subsequent resistance to change (Tummers 2011), which have been analyzed using questionnaires. On the other hand, quantitative methods are more difficult to apply when the focus is not on people and their attitudes and behavior, but on organizations, sectors, or even countries. Questionnaires could be used to collect data, but only based on assumptions about how individual perceptions can represent collective viewpoints. Studies on public management reform (such as Pollitt and Bouckaert 2011) therefore do not often use questionnaires, although they may use existing statistical data. An exception is Verhoest et al. (2012), who use survey data on agencification, a type of public management reform.

Other characteristics of the research topic play a role as well. Some research problems are more complex to study than others. When studying decision-making processes—such as within inter-organizational networks (Agranoff and McGuire 2001) —qualitative methods seem suited. Here, multiple actors with multiple positions have multiple interactions. Such processes require a methodological approach that allows the researcher to take much context into account. To be able to carry out such "holistic" research, the researcher will have to limit the number of units to study, hence a qualitative approach using case studies and, for instance, interviews as the primary source of data is an obvious choice.

Other factors that lead to different methodological choices relate to the *existence and use of alternative theories* in public administration research. Some themes in public administration literature have a strong deductive tradition. An example is the literature on public service motivation (PSM) (Perry and Hondeghem 2008). This research strand aims to, among others, deduce and test hypotheses, to improve measurements, and to reach conceptual consistency. This is reflected in the extensive body of literature that has been produced since the introduction of the PSM concept in the 1990s (Vandenabeele 2008; Wright and Grant 2010). On the other hand, research into, for instance, public management reforms has so far not been used to test theories as such. In fact, there is little consensus about the validity of theoretical explanations of reforms like agencification (James and Van Thiel 2011; Pollitt 2004). The public management literature is often criticized for being too normative, ambiguous. and theoretically underdeveloped (Pollitt and Bouckaert 2011, Chap. 1), which could also be related to its preference for an applied approach. Hence, qualitative research could play an important role in the process of theory development on public sector reform.

In sum, both qualitative and quantitative methods can be fruitful, depending on the research problem at hand and related issues of theory use and unit of analysis. Public administration research is inherently multi-disciplinary (Raadschelders 2011; Riccucci 2010), with a rich focus on topics and accordingly a vast mix of theories and methods. Public administration researchers vary in their preference

for inductive or deductive research, and accordingly for the use of theory and methods. This is cause for some concern among observers of public administration research, particularly about the methodological rigor of research in general and, more specifically, in case of quantitative research (see, e.g., Rhodes 1995; Gill and Meier 2000; Lee et al. 2012; Pollitt 2013). Review studies of public administration research fuel this concern, as will be discussed next.

Review Studies on the Use of Quantitative Research in Public Administration

As one of the first to analyze research methods used in the field of public administration, Perry and Kraemer (1986) reviewed all *Public Administration Review* (*PAR*) articles from 1975 through 1984. Two years later, Stallings and Ferris (1988) extended Perry and Kraemer's work by analyzing articles published in the same journal for the period from 1940 through 1984. Among other things, they concluded that the public administration field still lags behind compared to other social sciences in the application of advanced quantitative research techniques. Based on their findings, they recommended scholars make more use of statistical methods. Thereafter, several scholars have done research following up this recommendation by examining the state of the field regarding the use of quantitative research methods. Table 1 lists eight review articles which examined the use of quantitative research in public administration from 1990 onwards. Here, we will discuss the differences in sample, scope, and conclusions of these prior review studies.

In 1990, Houston and Delevan examined the nature of empirical research in six journals within the public administration discipline. For each journal included, they took a sample from all articles published during the five-year period from 1984 through 1988. Results from their review study indicated that there is a persistent lack of empirical research in which quantitative methods are employed (28% of all articles in the sample). In the articles that do, correlational analyses (84%) and multivariate techniques (most often linear regression; 60%) are common, while more sophisticated statistical techniques are made little use of. Four years later, Houston and Delevan (1994) used their dataset to compare the quantitative techniques used in public administration with related fields. They concluded that public administration research is less oriented toward theory testing and is less quantitatively rigorous than research conducted in related fields. Vijverberg (1997) found similar results in his study of the quantitative complexity of research in social sciences journals. The findings of his examination of three public-administration-related journals' full population indicated that public administration scholars make little use of advanced statistical methods and econometric techniques compared to their colleagues publishing in journals in economics, political science, and sociology. Lan and Anders (2000) empirically examined the research methods used in public administration for the period of 1993-1995. Their sample of eight public administration journals revealed that quantitative research methods are represented in 41% of the published articles. Furthermore, they found that most of the quantitative studies used only descriptive and/or inferential statistical methods.

TABLE 1
Overview of Studies on the Use of Quantitative Research in Public Administration Since 1990

Reference	*Subject(s) Analyzed Regarding Quantitative Research*	*Sample in Public Administration*	*Scope of Sample (# Years)*	*Total Number of Papers Analyzed*	*Conclusion Regarding Quantitative Research*	*% of Public Administration Articles That Uses Quantitative* Methods
Houston and Delevan 1990	Type of quantitative research designs used in public administration research	6 journals (*A&S, IJPA, PAQ, PSR, PBF, ROPPA*)	5 (1984–1988)	218 (sample of 6 or 7 articles per year per journal)	Quantitative research is used in 28% of public administration research. Statistical techniques most often used are correlational analyses (84%) and multivariate techniques (60%). Most research is cross-sectional (74%), conducted at the individual level (54%).	28%
Houston and Delevan 1994	Comparison of quantitative techniques used in public administration research with related fields	6 journals (*A&S, IJPA, PAQ, PSR, PBF, ROPPA*)	5 (1984–1988)	218 (sample of 6 or 7 articles per year per journal, quantitative articles chosen)	Public administration research is less oriented toward theory testing and is less quantitatively rigorous than that conducted in related fields.	–
Cozzetto 1994	Methodological quality of quantitative techniques	4 journals (*PAR, PAQ, PPM, PS*)	4 (1988–1991)	60 (random sample of quantitative articles in 4 journals)	Significant number of authors (40%) used inappropriate quantitative techniques and/or applied them incorrectly. Most researchers (83%) used less sophisticated statistical techniques.	44%
Vijverberg 1997	Comparison of quantitative techniques used in public administration research with related fields	3 journals (*JPART, PAR, JPAM*)	1 (1995)	99 (all articles)	44% of public administration research uses quantitative research methods. Public administration research is less oriented toward the use of advanced statistics or econometric techniques.	41%

Lan and Anders 2000	Type of research designs used in public administration research	8 journals (*PAR, A&S, ARPA, JPART, PPMR, PBF, ROPPA, JPAM*)	3 (1993–1995)	634 (all articles)	Quantitative methods used in 41% of public administration studies, most of them use descriptive and/or inferential statistics.	–
Wright, Manigault, and Black 2004	Methodological quality of quantitative techniques	6 journals (*A&S, ARPA, JPART, PAR, PPMR, ROPPA*)	3 (1996–1998)	143 (sample of 10 quantitative articles per journal per year,)	The current state of measurement practice in public administration is meager. Researchers often failed to report information that would allow their readers to appropriately judge the accuracy of research findings.	–
Pitts and Fernandez 2009	Type of research designs used in public administration research (specific: public management)	Conference papers PMRA conferences	3 (2001, 2003, 2005)	188 (sampling method unclear)	Quantitative methods used in 46% of public management studies; most of them use descriptive and/or inferential statistics.	46%
Lee, Benoit-Bryan, and Johnson 2012	Methodological quality of quantitative techniques (especially survey techniques)	5 journals (*ARPA, A&S, JPART, PA, PAR*)	8 (2000–2007)	264 (all quantitative survey research articles).	Survey research in public administration features mainly small-scale studies, reliance on a single data collection mode, questionable sample selection procedures, unspecified sample frame quality, and wide use of linear regression analysis without evaluation of model assumptions.	–

More recently, Pitts and Fernandez (2009) examined the state of public management research. Their review centered on four themes, of which two were related to public management methodology. They specifically focused on the use of empirical methods and the preference of qualitative versus quantitative research methods in this field by analyzing a sample of 188 papers presented at three years of Public Management Research Association Conferences. The results showed that 75% of the articles examined used empirical data and 46% reported research findings based on quantitative data. They also found that the most common approach to quantitative data analysis was provision of descriptive statistics (76%), followed by ordinary least squares (OLS) multivariate regression (45%).

Whereas the previously mentioned studies (Houston and Delevan 1990; 1994; Vijverberg 1997; Lan and Anders 2000; Pitts and Fernandez 2009) mainly focused on which research methods and techniques have been used most frequently by public administration scholars, Cozzetto (1994) examined whether the methods have been used appropriately. Using a sample of 60 quantitative articles published in four journals, Cozzetto assessed whether the techniques used were appropriate for the given measurement level of the variables included in the studies and whether they were applied correctly. His evaluation indicated that, in 40% of the cases, the statistical technique employed by the researcher was methodologically incorrect. Moreover, 83% used less sophisticated techniques such as simple percentages, frequency distributions, and basic descriptive statistics. Wright et al. (2004) also examined the methodological quality of quantitative techniques, but their focus was on data collection and measurement practices as reported in published PA research. For their evaluation, they took a sample of 10 articles using some form of quantitative measurement per year over a three-year period (1996–1998) from six leading journals in our discipline. They concluded that researchers frequently fail to report information on their quantitative measures that would allow their readers to appropriately judge the accuracy of research findings. Their results were confirmed by a recent study of Lee, Benoit-Bryan, and Johnson (2012). This study focused explicitly on survey research methods through a very detailed assessment of its application within the public administration literature. The authors reviewed five public administration journals over an eight-year period (2000–2007) and selected 264 articles using either primary or secondary survey data. The results from their sample showed significant gaps in reporting on data collection procedures and possible sources of error when using survey research methodology.

Looking at these review studies, it can be noted that that they have several merits, such as their focus on the methodological quality of the research being done, and the comparisons with other fields. However, there are also some limitations. With the exception of the study of Lee and colleagues (2012), all studies evaluated research published during a limited number of years: one to five years. Trends in time are then harder to find. However, there are indications of such trends. In the late 1980s, about 28% of PA research used quantitative methods (Houston and Delevan 1990), while during the 1990s (more specifically 1993–1995) this had increased to 41% (Lan and Anders 2000). Although only limited to public management research, the amount of papers that present quantitative methods in the early 2000s had reached 46% (Pitts

and Fernandez 2009). This might suggest that the field of public administration is indeed becoming increasingly quantitative, in accordance with the claims made by several authors (Pitts and Fernandez 2009, 405; Lee et al. 2012, 87; Perry 2012). In order to test this assertion, we take on a wider scope by analyzing 10 years of research published in four journals, which amounts to 1,605 articles.

Furthermore, in correspondence with review studies about the use of quantitative methods in related fields such as management (Scandura and Williams 2000) and work and organization psychology (Stone-Romero, Weaver, and Glenar 1995), we decided to examine the full population of articles, whereas most (but not all) review studies in public administration used sampling procedures (Houston and Delevan 1990; 1994; Cozzetto 1994; Wright et al. 2004; Lee et al. 2012). Using the full population gives us the possibility of making well-substantiated conclusions about the use of quantitative methods. As a result, we can delve deeper into the material. For instance, we can highlight differences between subfields within public administration and between the four journals. Furthermore, we can also analyze how the use of quantitative research in specific subfields has developed over time.

METHODS

Sample

In order to answer our three research questions, we examined four leading public administration journals listed in the Social Science Citations Index: *JPART*, *Governance*, *PAR*, and *PA*. These journals were chosen because they represent the mainstream public administration literature (Wright et al. 2004) and have been consistently ranked in the top 10 of public administration journals according to the ISI Journal Citation Report in the time period under study: 2001–2010.[1] For the whole of this period, we reviewed all articles published in all four journals. This time period was chosen to see what has happened in the 10-year period since Gill and Meier (2000) pleaded for an increased use of quantitative research methods in public administration. In total, 1,605 articles were included, of which 282 (17.6%) were published in *JPART*, 231 (14.4%) in *Governance*, 639 (39.8%) in *PAR* and 453 (28.2%) in *PA*. This already shows that journals differ largely in the number of issues and articles they publish; *PAR* has published almost three times as many articles as *Governance* between 2001–2010.

Measurements

To answer the research questions, a coding protocol was developed. In this protocol, several indicators were identified to code each study's characteristics of interest. Three coders (including two authors of this article) systematically coded the articles according to a protocol for analysis, which is shown in the Appendix. To assess the reliability of the coding, one coder reviewed and coded a random sample of 69 articles coded by the other two coders. The inter-coder reliability (Cohen's kappa) was calculated and ranged between .53 to .75 for the different codes, with only the coding of area of public administration below .60 and with 95% confidence

intervals between .41 and .88. The relatively low reliability of the coding area of public administration was primarily due to the fact that many articles contribute to two or even more areas at the same time and coders had to decide which was the primary subfield to which an article contributes (compare Pitts and Fernandez 2009). In all, we concluded that the reliability of the coding can be considered reasonable to good.

The first items in the coding protocol refer to the journal, the year of publication, the number of issues per year, and the number of articles per year. Second, we identified the research content of each article by placing the articles into content categories, building on the classification of Pitts and Fernandez (2009). We extended their list because these authors only focused on public management. This led to a list of 22 subfields (see Appendix and Table 2). These subfields could be re-categorized into three main categories: policy and politics, networks and governance, and public management. This three-way typology is in line with Raadschelders (2011), who lists these three themes as main strands in public administration. Articles that did not fit one of these categories were coded as ''other.'' This is, for instance, the case for research into research methods and studies on ethical behavior.

Between 2001–2010, most articles were published on public management topics (42.2%), followed by policy and politics (30.8%). Networks and governance has the lowest number of publications, but such articles have appeared in comparable numbers in all four journals. For other subfields, journals show different profiles. In addition to public management topics, *JPART* has published mostly on networks and motivation; *PA* on networks and policymaking; *PAR* on other topics (conceptual), democracy, networks, and performance; and *Governance* on policymaking/development, networks, and international governance. This would suggest that either journals have a more focused profile than expected, or researchers target different journals for different topics.

Next, we coded the type of data: quantitative, qualitative, both (indicative of a mixed methods design), or none (for instance, conceptual articles). If the research presented quantitative data, we used more specific indicators of the quantitative methods used. A distinction was made between primary and secondary data. The first option was a self-administered survey.[2] Articles were coded as survey research when they were based on survey data that the authors collected themselves. (When the authors made use of a survey that was carried out by others, it was coded as secondary data; see below). The second option was primary data (excluding survey); we identified an article as primary research when the authors collected the data themselves using any other method than a survey (for example, collecting staff numbers or financial indicators of an organization). The third option was statistical analysis of secondary data. A distinction was made between research that used statistical analysis of survey data collected by others, such as the European Social Survey, and the analysis of, for example, financial, performance, or other quantitative data. Fourth, articles in which multiple quantitative methods were employed were coded as ''combination of quantitative methods.'' Fifth, articles were coded as ''other'' when it was unclear what the source of the data was. This was only the case for three articles.

TABLE 2
Distribution of Number of Articles on 22 Topics in Four Journals 2001–2010 ($N = 1{,}605$)

	JPART	Governance	PAR	PA	*Total*
Policy and politics	54	119	170	152	495 (30.8%)
Policy implementation, street-level bureaucrats, policy discretion	17	3	19	15	54
Democracy, accountability, auditing, responsiveness, citizen satisfaction, legitimacy, trust, citizen participation	18	20	68	31	137
Policymaking/development, policy transfer/learning/change, corporatism, multilevel governance, decision-making process	7	49	32	46	134
Bureaucracy theory, bureaucratic and political control, regulation	10	14	27	15	66
Politics–administration dichotomy/ relationship	2	10	16	17	45
International governance, international organizations, regimes, European Union/Parliament/Commission	0	23	2	28	53
Elections	0	0	6	0	6
Networks and complex governance	52	39	66	51	208 (13.0%)
Networks, privatizations, contracting out, "hollow state," collaboration, advocacy coalitions	50	32	60	50	192
Public–private distinction	2	7	6	1	16
Public management	142	42	288	206	678 (42.2%)
Information technology and e-government	12	4	22	4	42
Public management, public management reform	27	27	46	101	201
Strategic planning and management	10	1	2	3	16
Conflict resolution and crisis management	5	1	19	3	28
Financial management and budgeting	10	4	30	4	48
Organizational performance, performance management/measurement/ information	15	0	52	30	97
Human resource management	1	0	26	10	37
Organizational change, innovation and learning	14	0	10	29	53
Diversity management, representative bureaucracy, gender/equity	16	1	27	2	46
Leadership, decision making	8	4	31	8	51

(*Continued*)

TABLE 2
Continued

	JPART	Governance	PAR	PA	*Total*
Motivation (incl. PSM), job satisfaction, commitment, job behavior, job attitudes, ethics/integrity, red tape	24	0	23	12	59
Other	34	31	115	44	224 (14.0%)
Research methods and epistemology, PAtheory development	5	2	19	24	50
None of the above	29	29	96	20	174
Total	282 (17.6%)	231 (14.4%)	639 (39.8%)	453 (28.2%)	1605 (100%)

RESULTS

The Development of Quantitative Methods in Public Administration

Table 3 presents the number (percentage) of journal articles published between 2001–2010 by type of data used. It shows that 29.2% ($N = 469$) of the journal articles reported the use of quantitative data and 37.9% ($N = 608$) reported the use of qualitative data, suggesting that public administration scholars more often use qualitative than quantitative research methods. About a quarter of the articles published in the four journals between 2001–2010 (434; 27.0%) were not based on empirical research (see Table 3). Since conceptual articles do not employ research methods, these have been excluded from the analyses. Furthermore, from the articles that conduct empirical research, we identified only 94 articles in which both quantitative and qualitative data are used. Hence, only 5.9% employ a mixed method design. This leaves us with 1,077 single-method empirical articles included in the first analysis. We use these articles to answer our first research question.

TABLE 3
Number (Percent) of Journal Articles by Type of Data Used, 2001–2010 ($N = 1,605$)

Type of Research	*Type of Data*	*Number (Percent) of Journal Articles*	*Total*
Empirical research			1,171 (73.0%)
	Quantitative data used	469 (29.2%)	
	Qualitative data used	608 (37.9%)	
	Both quantitative and qualitative data used	94 (5.9%)	
Conceptual research	No data used	434 (27.0%)	434 (27.0%)
Total			1,605 (100%)

To examine how the ratio of quantitative and qualitative research articles has developed over time, we plotted the difference between the percentage of quantitative and the percentage of qualitative research for a 10-year period from 2001 to 2010 (see Figure 1). Figure 1 shows that, for almost all years, the use of qualitative data is higher than the use of quantitative data, with an average of 13 percentage points in favor of qualitative data. However, it seems we can observe a pattern in the relative frequency of research based on qualitative data compared to quantitative data. In 2001, 61.1% of all single-method empirical studies reported using qualitative methods against 38.9% reporting using quantitative methods. In 2010, they almost switched positions: 41.7% qualitative against 58.3% quantitative. To test whether the share of published quantitative research and the 10-year time lapse may be regarded as statistically dependent, we calculated the Kendall's tau-c coefficient. The result indicated that there is a statistically significant association between the use of quantitative methods and time (Kendall's tau-c $= -0.117$, $p < 0.05$). This would indicate that there is indeed a trend towards more quantitative research.

However, the choice of journals could affect the outcome of our analysis in Figure 1. Therefore, Table 4 shows the number (percentage) of journal articles by type of data used and journal. From this table it seems that quantitative research is most prominent in *JPART*, far less prominent in *Governance* and *PA*, and equally prominent in *PAR* compared to qualitative research. These differences between the journals are statistically significant.

Figure 2 shows the difference between the percentage of quantitative and qualitative research over time by journal. *Governance* is the most "qualitative-oriented" journal of all. In 2003 and 2007, none of the journal articles reported the use of quantitative research (100% points difference). Furthermore, every year at least 75% of all published pieces in *Governance* reported the use of qualitative research methods (50% points difference). Not surprisingly, we did not find a statistically

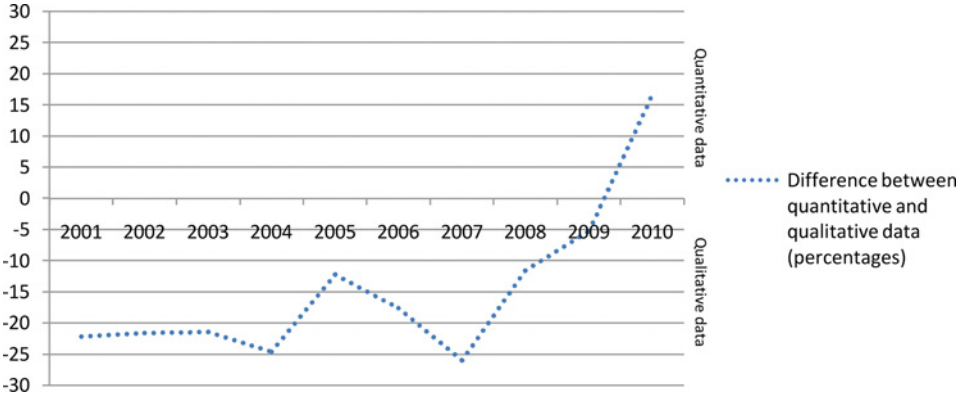

Figure 1. Difference Between Quantitative and Qualitative Data in Public Administration Research over Time (Percentages) ($N = 1{,}077$).

TABLE 4
Number (Percent) of Journal Articles by Type of Data Used and Journal, 2001–2010 ($N = 1{,}077$)

Journal	*Type of Data*	*Number (Percent) of Journal Articles*	*Total*
JPART	Quantitative	183 (76.2%)	240 (22.3%)
	Qualitative	57 (23.8%)	
Governance	Quantitative	21 (13.5%)	155 (14.4%)
	Qualitative	134 (86.6%)	
PAR	Quantitative	188 (48.7%)	386 (35.8%)
	Qualitative	198 (51.3%)	
PA	Quantitative	77 (26.0%)	296 (27.5%)
	Qualitative	219 (74.0%)	
Total			1,077 (100%)

significant association between quantitative research in *Governance* and time (Kendall's tau-c = 0.076, $N = 155$, $p = 0.241$).

The results in Figure 2 show that, during the 10-year period, research in *JPART* has been more quantitatively oriented.[3] Furthermore, we found a correlation between quantitative research and the 10-year timespan for articles published in *JPART* (Kendall's tau-c = − 0.148, $N = 240$, $p < 0.05$). The articles published in *PA* also seem to become more quantitatively oriented. The tau-coefficient proved to be significant (Kendall's tau-c = − 0.175, $N = 296$, $p < 0.05$).

Journal articles published in *PAR* do not appear to show any distinct preference as to type of research data. We observe only a small increase in the percentage of

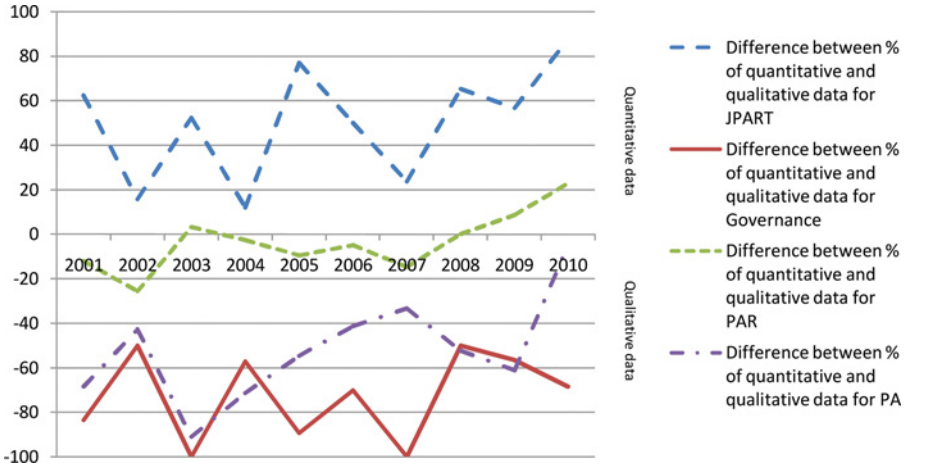

Figure 2. Difference Between Quantitative and Qualitative Data in Public Administration Research over Time by Journal (Percentages) ($N = 1{,}077$).

quantitative research in the last three years from 2008 through 2010. The tau-coefficient did not show an association between quantitative research and time (Kendall's tau-c = − 0.108, $N = 386$, $p = 0.063$).

To sum up, there appears to be an increase in quantitative research but mostly in the articles published in *JPART* and *PA*, although *PAR* does publish many quantitative research articles as well. This could also be related to the types of topic on which authors publish in these journals. That will be studied below when we go into question 3. First, we will look into which quantitative methods are used most often.

Dominant Quantitative Methods in Public Administration Research

The second research question refers to the preferences or dominant methods of public administration scholars when using quantitative methods. As we focus on quantitative methods, we excluded the articles in which mixed methods, qualitative methods, or no empirical research are conducted. Furthermore, the "other" category (see Section 3) for quantitative methods was excluded (only three articles). This left us with 469 articles. Table 5 shows the percentage of the specific types of quantitative method(s) used. Conducting a survey ($N = 169$; 36%) and statistical analysis of secondary survey data ($N = 126$; 26.9%) are the most prominent quantitative research methods. Secondary statistical data collected by other means than a survey are analyzed in 84 articles (17.9%). Statistical analysis of primary data other than originating from a survey ($N = 54$; 11.5%) and a mixture of quantitative methods ($N = 36$; 7.7%) are least often employed.

To see how the dominant methods developed over time, we plotted the percentage of each of the quantitative research methods for the 10-year period from 2001 through 2010. Figure 3 reveals that conducting surveys and statistical analysis of secondary survey data are both dominant methods throughout the entire period between 2001 and 2010. To test if the choice of research method is associated with the year of publication, we calculated the Lambda coefficient. The results indicated that there is a statistically significant, but weak, association between these two variables (Lambda = 0,054, $p = 0{,}011$) and trends over time cannot be assessed.

TABLE 5
Number (Percent) of Journal Articles by Type of Quantitative Research Method, 2001–2010 ($N = 469$)

Type of Research Method	*Number (Percent) of Journal Articles*
Survey	169 (36.0%)
Statistical analysis of primary data	54 (11.5%)
Statistical analysis of secondary data: survey	126 (26.9%)
Statistical analysis of secondary data: non-survey	84 (17.9%)
Both survey and statistical analysis of primary or secondary data	36 (7.7%)
Total	469 (100%)

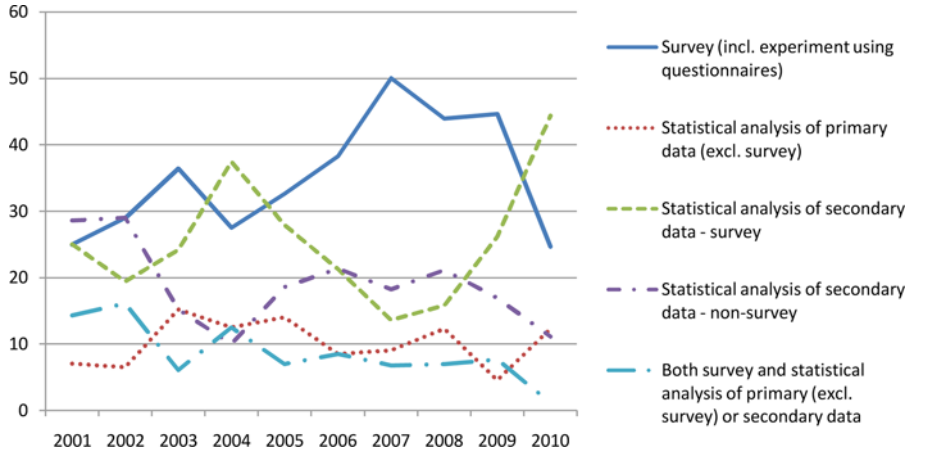

Figure 3. Development of the Specific Type of Quantitative Method(s) Used by Public Administration Scholars over Time ($N = 469$).

Differences in the Use of Quantitative Methods Across Fields of Research

To answer the third research question—"Which fields in public administration are frequent users of quantitative methods and which fields are not?"—we included all articles in which either quantitative or qualitative methods were used. Articles in which both quantitative and qualitative data or no empirical data are used are again excluded from the analyses. This leaves us with 1,077 articles in total: 337 (31.7%) on policy and politics, 487 (45.2%) on public management topics, and 155 (14.4%) on networks and governance. The remaining 98 articles (9.1%) have been labeled as other. Table 6 shows the number of journal articles by type of data and area of public administration.

TABLE 6
Number (Percent) of Journal Articles by Type of Data Used and Area of Public Administration, 2001–2010 ($N = 1,077$)

Area of Public Administration	*Type of Data*	*Number (Percent) of Journal Articles*	*Total*
Policy and politics	Quantitative data	110 (32.6%)	337 (31.3%)
	Qualitative data	227 (67.4%)	
Networks and complex governance	Quantitative data	70 (45.2%)	155 (14.4%)
	Qualitative data	85 (54.8%)	
Public management	Quantitative data	253 (52.0%)	487 (45.2%)
	Qualitative data	234 (48.0%)	
Other	Quantitative data	36 (36.7%)	98 (9.1%)
	Qualitative data	62 (63.3%)	
Total			1,077 (100%)

The majority of articles on research related to policy and politics report the results of qualitative research. In articles within the category of networks and governance and public management, the use of either quantitative data or qualitative data is more equally distributed. Looking at the articles labeled as "other," qualitative data were used more often (63.3%) than quantitative data (36.7%). As before, we have plotted these data to see whether we can identify any trends (see Figure 4).

Looking at the use of quantitative data across the fields throughout the 2001-2010 period, we can conclude that there is no particular increasing or decreasing pattern for policy and politics articles (see Figure 4). However, articles that focus on networks and governance or on public management appear to have increasingly used quantitative data compared to qualitative data from 2007 on. To test whether there is a relationship between the use of quantitative data and time, we calculated the tau-coefficient for each category. This coefficient was indeed statistically significant for the articles we classified into the networks and governance (Kendall's tau-c = $-.320$, $N = 155$, $p < 0.01$) and the public management areas (Kendall's tau-c = $-0{,}106$, $N = 487$, $p = 0{,}040$). The results show that there is no such relationship for "Policy and politics" (Kendall's tau-c = -0.057, $N = 337$, $p = 0.331$) and "Other" (Kendall's tau-c = 0.096, $N = 98$, $p = 0.416$).

Table 7 provides a more detailed insight into the use of quantitative methods in journal articles in different areas of public administration in the four journals. Quantitative methods are mostly applied in research into public management topics, such as performance management, financial management, e-government, strategic management, and HRM-related topics, including motivation and diversity management. These are also the topics that appear most in *JPART* and *PA*. Conceptual articles, without data, appear most in *PAR*.

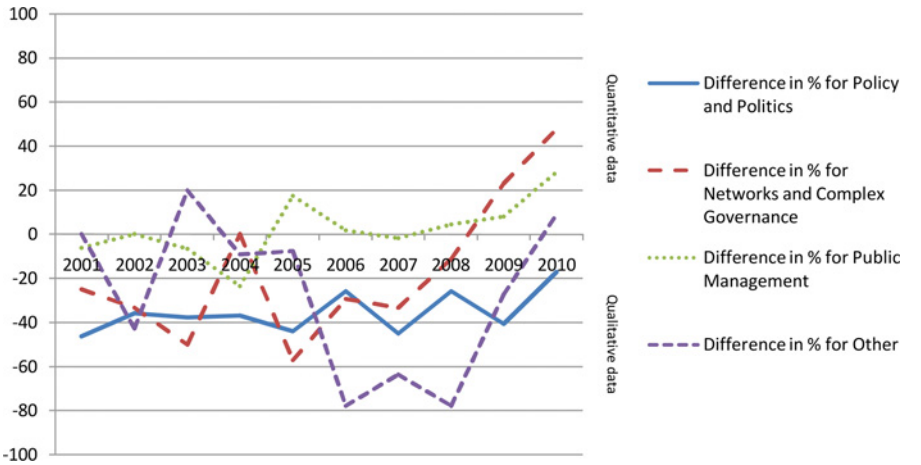

Figure 4. Difference Between Quantitative and Qualitative Data in Public Administration Research by Area of Public Administration over Time ($N = 1{,}077$)

TABLE 7
Division of Articles per Type of Data and Journals, 2001–2010 ($N = 1{,}605$)

Area of Public Administration	*Predominant Type of Data and Journal*
Policy and politics	45.8% **qualitative** data (227/495)
Policy implementation, street-level bureaucrats, policy discretion	50% **qualitative** data (27/54), about 50% in *JPART, PAR*, and *PA*
Democracy, accountability, auditing, responsiveness, citizen satisfaction, legitimacy, trust, citizen participation	41.6% **qualitative** data (57/137), mainly in *PAR* (26/68 = 38.2%)
Policymaking/development, policy transfer/learning/change, corporatism, multilevel governance, decision-making process	56.7% **qualitative** data (76/134), mainly in *Governance* (33/49 = 67.3%) and *PA* (24/46 = 52%)
Bureaucracy theory, bureaucratic and political control, regulation	43.9% **qualitative** data (29/66), mainly in *Governance* (9/14 = 64.3%) and *PA* (10/15 = 66.7%) 27.3% **no data** (18/66), mainly in *PAR* (10/27 = 37%)
Politics–administration dichotomy/ relationship	45 articles, equally divided along type of data, in *PAR* mainly no data (8/16 = 50%), in *Governance* mainly qualitative data (6/10 = 60%)
International governance, international organizations, regimes, European Union/Parliament/Commission	Equal division between **qualitative** data (20/53 = 37.7%, mainly in *PA*: 12/28 = 42.9%) and **no data** (19/53 = 35.8%, mainly in *Governance*: 13/23 = 56.5%)
Elections	66.7% **qualitative** data (4/6), all in *PAR*
Networks and complex governance	40.9% qualitative data (85/208)
Networks, privatizations, contracting out, "hollow state," collaboration, advocacy coalitions	40.6% **qualitative** data (78/192), in *Governance* (21/32 = 65.6%), *PA* (30/50 = 60%) and *PAR* (24/60 = 40%) 34.9% **quantitative** data (67/192), mainly in *JPART* (31/50 = 62%)
Public–private distinction	43.8% **qualitative** data (7/16), mainly in *Governance* (5/7 = 71.4%)
Public management	37.3% **quantitative** data (253/678) and 34.5% **qualitative** data (234/678)
Information technology and e-government	57.1% **quantitative** data (24/42), both in *JPART* (8/12: 66.7%) and *PAR* (12/22 = 54.5%)
Public management, public management reform	43.3% **qualitative** data (87/201, in *PA* 48/101 = 47.5%) or **no data** (68/ 201 = 33.8%, in *PA*: 33/101 = 32.7%)
Strategic planning and management	50% **quantitative** data (8/16), mainly in *JPART* (5/10 = 50%)

(*Continued*)

TABLE 7
Continued

Area of Public Administration	*Predominant Type of Data and Journal*
Conflict resolution and crisis management	64.3% **qualitative** data (18/28), mainly in *PAR* (12/19 = 63.2%)
Financial management and budgeting	43.8% **quantitative** data (21/48), mainly in *PAR* (11/30 = 36,7%) (for *PAR* equal percentage of no data used)
Organizational performance, performance management/measurement/information	46.4% **quantitative** data (45/97), mainly in *JPART* (15/15 = 100%) and *PAR* (20/52 = 38.5%)
Human resource management	51.4% **quantitative** data (19/37), mainly in *PAR* (16/26 = 61.5%)
Organizational change, innovation and learning	58.5% **qualitative** data (31/53), mainly in *PA* (22/29 = 75.9%)
Diversity management, representative bureaucracy, gender/equity	73.9% **quantitative** data (34/46), in *JPART* (14/16 = 87.5%) and *PAR* (19/27 = 70.4%)
Leadership, decision making	41.2% **qualitative** (21/51), mainly in *PAR* (11/31 = 35.5%) But in *PAR* mostly **no data** (12/13 = 92.3%)
Motivation (incl. PSM), job satisfaction, commitment, job ehaviour, job attitudes, ethics/integrity, red tape	62.7% **quantitative** data (37/59), mostly in *JPART* (20/24 = 83.3%)
Other	51.8% **no data** (116/224)
Research methods and epistemology, PA theory development	70.0% **no data** (35/50), mainly in *PAR* (15/19 = 78.9%) and *PA* (17/24 = 70.8%)
None of the above	46.6% **no data** (81/174), mostly in *PAR* (59/96 = 61.5%)

DISCUSSION

This article aims to contribute to recent debates on research methods in public administration by examining the use of quantitative methods in public administration research articles. Our study included 1,605 articles published between 2001–2010 in four leading journals: *JPART, PAR*, *Governance*, and *PA*.

First, we examined the share of articles using quantitative methods compared to the share of articles using qualitative research methods, and their development over time. We found that, in the four journals analyzed between 2001 and 2010, more articles reported using qualitative methods than quantitative methods, although both methods are represented in a substantial number of articles (608 and 469, respectively). Furthermore, we observed that of the quantitative methods used, primary and secondary survey data are most dominant. Hence, our analysis nuances the claim of Perry (2012, 480), who argues that "[w]ithin public administration, survey research is our most-used method." Although a lot of quantitative research is being conducted, qualitative methods are still dominant (cf. Pollitt 2006; 2013).

However, it seems that there is indeed a trend towards using quantitative methods, particularly in the field of research on networks and governance, while studies into public management have always been quantitative to a large extent. Overall, the increase in quantitative research is significant. We can therefore verify the claim, made by other authors, that the public administration discipline is becoming increasingly quantitative (Pitts and Fernandez 2004, 405; Lee et al. 2012, 87). An obvious implication is that students should be educated about both types of methods so that they can understand the literature and can assess the pros and cons of various research methods, given the underlying methodology within a specific study (compare Haverland and Yanow 2012). In addition, a solid knowledge of quantitative methods seems to be increasingly valuable for public administration scholars and students—and also for practitioners who want to understand research publications to keep their knowledge up to date.

Second, we found that very few studies employ a mixed methods design. Given the benefits of such designs as emphasized by various methodologists (for instance, Creswell and Clark 2007), it would be worthwhile for future studies to consider employing mixed methods designs more often. Related to this, we analyzed the preferences or dominant methods of public administration scholars when using quantitative methods. It seems that survey data, either from self-administered surveys or as secondary sources, are used most often, while primary data (excluding surveys) and a combination of methods are used less often.

Lastly, we analyzed in which subfields of public administration research quantitative methods are used most frequently. Important differences between the various fields were found. The policy and politics fields seem to be dominated by qualitative methods. On the other hand, scholars in public management seem to be more inclined to use quantitative methods, particularly in HRM-management-related topics, and in financial, performance. and strategic management studies. In the field of networks and governance, a more even distribution was found, although the use of quantitative methods has increased considerably.

Although our study has offered valuable insights into the use of research methods in public administration, we must point out some limitations of our analysis. One limitation concerns the choice of journals. We included four main journals in our search for answering the research questions. These journals were chosen because they represent the mainstream public administration literature and are among the highest ranked in public administration. However, articles within these journals are not, by definition, representative of the whole population of international, peer-reviewed, public-administration-related articles (or even broader, all research related to public administration which is being conducted). It could, for instance, be the case that these four journals taken together are becoming increasingly quantitative, while the entire field is moving in another direction. Hence, some caution when interpreting the results is recommended.

A second limitation refers to our aim to draw conclusions about trends in the use of quantitative methods over time. In correspondence with previous review studies, we calculated correlations between methods used and year of publication to examine these trends (see, for example, Scandura and Williams 2000; Stone-Romero et al.

1995). Time series analyses would have been better to look for trends, but the small time frame of ''only'' 10 years prevented us from doing so.

Despite these limitations, we believe our analyses have shed light on the developments in the use of quantitative methods in public administration research. In sum, the majority of public administration research is still qualitative, but if the increase in quantitative research continues, the discipline may look different in another 10 years' time. We do not wish to imply that quantitative research methods should always be preferred, though as noted before, the choice of a research method depends on the research problem at hand and the philosophical positions of researchers. Moreover, public administration research is characterized by a large variety in topics as, for example, becomes visible through the list of 22 subfields. This plurality extends also to the choice of research methods, as well as the application of theory (Raadschelders 2011). This may be a reason for concern, if authors do not explicate or are even unaware of how the formulation of the research question of their study, the role of theory, and the choice of research methods are related to their philosophical position. These choices should be consistent within a specific study and preferably made explicit within research articles to prevent misunderstandings during academic discussions (Haverland & Yanow 2012). Our plea for the use of mixed methods must be understood in this way, too—mixing methods without mixing methodologies within a single study.

Related to this, our findings on the use of quantitative and qualitative methods in specific areas of research should be understood as an incentive to raise questions about how the state of a particular subfield is related to the choice of specific research methods. For instance, qualitative research can play an important role in theory development, which is relevant for relatively unexplored areas of research. Although quantitative research can also be used for exploration, since it is more systematic in nature, it offers more opportunities to develop and validate measurements and test theories, contributing to the development of public administration as a discipline, to become more like a ''normal science'' (cf. Riccucci 2010).

Such a development is enhanced by the development of new statistical techniques and the increasing availability of advanced statistical software. The possibilities for statistically analyzing complex relationships between variables across levels of analysis are increasing the moment we are writing this article. This provides researchers with new opportunities for testing theories, for example in the fields of multilevel governance (related to developments such as multilevel modeling) or comparative public management (related to developments such as measurement invariance). However, it also entails risks for the development of public administration as a discipline. Firstly, newly developed techniques and software enter public administration research primarily through other disciplines, such as psychology, political science and, to a lesser extent, econometrics. The adoption of techniques from other disciplines may induce a substantive change in focus when topics and/or theoretical approaches are imported as well. We argue that public administration scholars must beware of formulation of research problems becoming determined by the availability of research methods and techniques.

Secondly, in a world in which quantitative data can be collected more easily, for example through online surveys, and statistical software programs are available that ease data analysis, we run the risk of losing sight of the quality of quantitative data (sampling and measurement). Here, the old adage says, "garbage in, garbage out." Furthermore, while the availability of statistical software programs has many advantages, the statistical knowledge of their users may lag behind. Most advanced statistical software is relatively easy to use, but the underlying statistics are hard to understand, which may affect the adequacy and quality of statistical analyses. Our current data set does not offer information about sampling procedures, specific techniques, the use of software, nor about the quality of statistical analyses (but see Lee et al. 2012; Wright et al. 2004). Such data should be collected next, to be able to draw conclusions about the quality of quantitative research in public administration.

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NOTES

1. Except for *PAR* which has been placed at number 11 in the 2011 JCR database.
2. When a (quasi-)experimental research design including self-administered questionnaires was used, the article was coded as survey.
3. We must note that the ChiSquare does not meet all requirements (some expected cell counts are <5). Hence, we should be careful in interpreting these results.

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APPENDIX: PROTOCOL FOR ANALYSIS

Journal

1. *Journal of Public Administration Research and Theory* (*JPART*)
2. *Governance*
3. *Public Administration Review* (*PAR*)
4. *Public Administration* (*PA*)

Issues/Year (number)
Articles/Year (number)
Year (calendar year)
Area of Public Administration (Pitts and Fernandez, 2009; adjusted)

1. Human Resource Management (recoded into "Public management" category)
2. Organizational change, change management, innovation and learning (recoded into "Public management" category)
3. Diversity management and representative bureaucracy, gender (recoded into "Public management" category)
4. Leadership and decision making (recoded into "Public management" category)
5. Motivation (incl. PSM), job satisfaction, commitment (recoded into "Public management" category)
6. Networks, privatizations, contracting out, "hollow state," collaboration, advocacy coalitions (recoded into "Networks and complex governance" category)
7. Information technology and e-government (recoded into "Public management" category)
8. Public management, public management reform (recoded into "Public management" category)
9. Strategic planning and management (recoded into "Public management" category)
10. Policy implementation, street-level bureaucrats, policy discretion (recoded into "Policy and politics" category)
11. Conflict resolution and crisis management (recoded into "Public management" category)
12. Democracy, accountability, auditing, responsiveness, citizen satisfaction (recoded into "Policy and politics" category)

13. Financial management and budgeting (recoded into "Public management" category)
14. Policymaking (recoded into "Policy and politics" category)
15. Public-private distinction (recoded into "Networks and complex governance" category)
16. Bureaucracy theory, bureaucratic and political control (recoded into "Policy and politics" category)
17. Politics-administration dichotomy (recoded into "Policy and politics" category)
18. Research methods and epistemology (recoded into "Other" category)
19. Organizational performance, performance management, measurement, information (recoded into "Public management" category)
20. International governance, international organizations, regimes (recoded into "Policy and politics" category)
21. Elections (recoded into "Policy and politics" category)
22. None of the above (recoded into "Other" category)

Type of data (Pitts and Fernandez 2009)

1. Quantitative
2. Qualitative
3. Both quantitative and qualitative
4. No data were used

Method(s) (Wright et al. 2004; adjusted (original item split in two variables: method and type of survey))

1. Survey
2. Statistical analysis of primary data (excl. survey)
3. Statistical analysis of secondary data: survey
4. Statistical analysis of secondary data: other than survey
5. Combination: Both survey and statistical analysis of secondary or primary data
6. Other

−1 Not applicable
−2 Not mentioned

Note about missing, not applicable, and not mentioned: Missing (code −1) means not applicable (for example, when qualitative data are used). In some articles, a survey is used for data collection but explicit information about the data collection is not mentioned (for instance, the response rate is not mentioned). In this case, scores are not coded as missing, but the "not mentioned category" (code −2) is scored.