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## **The Governance of Big Data: Perspectives and Issues**

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### **Abstract**

Part of governance theory highlights that, within any policy domain or sub-system, the institutional structure plays a major role in shaping how policy issues are considered, actors interact, and outcomes are evaluated. This “modernist theory of governance” stands in contrast with another, “interpretive” approach, for which governance theory should provide explanations that refer to the reasons on which people act, especially by looking at actors' beliefs, preferences, and meanings. This paper investigates the formation of ideas about the role of a source of technological change and its implications for governance practices and regime. The study focuses on the emergence of Big Data and their expected role in public administration. Using Q-methodology, the analysis shows the formation of three viewpoints about Big Data and how public administration should deal with them. Findings of this study allow to draw some qualifications around the relationship between ideas and institutions for explaining governance stability and change.

### **Keywords**

Governance theory, governance change, Big Data, public administration, Q-methodology

## The Governance of Big Data: Perspectives and Issues

### 1. Introduction.

During last decades, the concept of governance became one of the cornerstones of public policy studies (Hill and Hupe, 2002; Bogason, 2000; Rhodes, 1997) and political theory (Peters, 2012; Stoker, 1998). Variously conceived as “a *new* process of governing; or a *changed* condition of ordered rule; or the *new* method by which society is governed” (Rhodes, 2007: 1246), governance is a multi-faceted notion that may denote different kinds of social processes or regimes. As a theoretical resource, however, governance is pivotal to conceptualize and argue about the making, implementation, and evaluation of policies, especially within the context of contemporary pluralist and multi-layered policy domains. In the contemporary scholarly inquiry, indeed, research about public governance seems to subsume a number of areas of investigation, such as participatory public deliberation, inter-organizational collaboration, and network management.

Governance theory generally holds that the policy process is largely affected by (and should be understood as taking place within) complex inter-organizational settings that are populated by multiple actors – including public authorities, business companies, and the civil society. According to a well-established perspective (Peters, 2011a, 2011b), governance theory highlights that, within any policy domain or sub-system (Marsh and Rhodes, 1992; Jordan, 1990), the institutional structure plays a major role in shaping how policy issues are considered, actors interact, and outcomes are evaluated. This “modernist theory of governance” stands in contrast with another, “interpretive” approach, for which governance theory should provide explanations that “refer to the reasons on which people act, and they have to make sense of these reasons by locating them against the background of historically specific traditions and dilemmas” (Bevir and Krupicka, 2011: 450). While scholars like Peters (2011a: 69) argue that “governance begins with structures and processes

rather than the individuals within them”, others contend that institutions, structures and processes are contingent, changeable, and contestable practices, and that governance should be rather understood by exploring the webs of beliefs of actors that inform their meaningful practices.

The aims of this paper is to contribute to the refinement of the “interpretive” approach to the theory of governance by investigating the emergence of ideas about the governance of a particular policy domain under conditions that include sources of change in technology and related socio-technical systems (Geels, 2005, 2004; Cummings, 1978). The reason for the selection of this kind of scenario is that a theory of governance that heavily relies on institutions, structures, and processes seems well equipped to account for the reproduction or adjustment of social practices within a relatively stable context, where individual beliefs, preferences, and meanings may not significantly affect the established institutional and social order. As Peters (2011b: 468) put it, “if in the end all those interpretations become subsumed under institutional processes then are we really better off for having worried so much over those interpretations? ... I and others are perfectly capable of understanding those interactions without having all the interpretations from the individual actors involved”. However, when individuals face dilemmas that originate from challenges to established patterns of interaction, as it may be the case when the prospect of technological change can potentially disrupt established socio-technical systems, then interpretations, discourses, and narratives regain importance to understand how governance practices and regimes change over time.

This study is especially focused on the emergence of so-called Big Data and their impact on the domain of ICT in public administration. ICT in public administration is a complex inter-organizational system populated by public authorities and private actors (e.g., software houses, consulting firms, and telecom companies), that typically collaborate in collecting, storing, sharing, and analyzing data for both public and private purposes. The domain of ICT in public administration is also typically exposed to a persistent flow of sources of technological change (e.g.,

increase of speed of Internet connection, advances in cryptography, adoption of standard protocols for data sharing, etc.), which contribute reshaping patterns of inter-organizational relationships and institutional arrangements. Big Data provide a contemporary instance of such sources of change. Big Data are formed through the recording and storage of traces of various acts performed by individuals over time, such as financial transactions, social media traffic, health records, and GPS coordinates, often by means of mobile tools (Manyika *et al.*, 2011). Big Data are expected to provide enormous opportunities for designing and delivering more efficient and effective public policies (Bollier, 2010; boyd and Crawford, 2012; Manovich, 2011), in such ways as, for example, detecting early signs of emerging trends (e.g., disease spread), monitoring social behavior (e.g., response to emergency), measuring behavioral or economic impact of policy measures (e.g., traffic congestions or credit card expenses), picking the “sentiment” of communities (e.g., mainstream micro-blogging topics and crowd-sourcing), and anticipating future behavior (e.g., predictive policing). By means of advanced statistical and computational techniques, public sector analysts may unveil patterns and anomalies within these large socio-economic datasets that may not be ordinarily evident on the basis of “conventional” information channels, such as national census.

The role of technological change in ICT in public administration has been highlighted in several studies (Dunleavy *et al.*, 2005; Hood and Margetts, 2007; Marche and McNiven, 2003; Margetts, 2009; Moon, 2002; Osborne and Brown, 2011). Big Data, however, pose some special prospects and issues. On the one hand, the availability of these datasets calls for a reconsideration of the role of the government within the system of public value creation, especially in relation to the use of governments' tools (i.e., nodality, authority, treasure, and organizational capacity) for orchestrating the exploitation of Big Data for designing, implementing, and evaluating public policies. On the other hand, questions arise with respect to who owns and controls Big Data, who supplies the information contained in Big Data and why they produce it, who demands the information hosted in Big Data and why they ask for it, and what strategy should governments

follow to actively engage business companies and the civil society for making use of Big Data for public purposes. As such, Big Data offer the opportunity to investigate the formation of ideas about the role of a new technology and its consequences for the redefinition of the governance of ICT in public administration.

The rest of the paper is organized as follows. Next section will review the literature on governance theory. Section three will illustrate the research design of this study. Section four will describe the analysis of ideas about the role of Big Data in public administration and on what should be done about them. Finally, section five will draw the conclusions of this study.

## **2. Governance Theory: Institutional and Ideational Approaches.**

During last decades, the concept of governance gained a central place in the scholarly discussion about the relationship between public authorities, business companies, and the civil society. This apparent success, however, has been accompanied by variety and, to some extent, inconsistency in the meanings attached to the term (Lewis, 2011). In a very general sense, governance has been alternatively described as a steering process (Pierre and Peters, 2000), a hybrid form of collaboration between different public and private actors (Roiseland, 2011), a cross-sector partnership and multi-layered process of policy-making opposed to the one that takes place in the hierarchical unitarian state (Greenaway *et al.*, 2007), and as the involvement of society in the process of governing (Rhodes, 2000). Kjær (2004) illustrated different meanings of the term, which included the usage of governance in public administration and public policy, in international relations, in the European Union, in comparative politics, and as used in the phrase “good governance” in the World Bank sense.

Especially within the Anglo-Saxon scholarly community, the term governance is primarily associated to the works of Rhodes (2007, 1997; Kjær, 2011; Davies, 2005; Marinetto, 2003), who defined it as “self-organizing, inter-organizational networks characterized by interdependence,

resource-exchange, rules of the game, and significant autonomy from the state” (Rhodes 1997, p. 15). In contrast, Continental European scholars tend to highlight the importance of social-political interactions as essential elements of the governance concept (Kooiman, 2003, 1993). The fundamental characteristic of governance as a networked system of interdependent actors, however, is generally widely shared. For several scholars, indeed, governance only makes sense in the form of governance networks (Kjær, 2011; Klijn, 2008; Koppenjan and Klijn, 2004), that are understood as relatively stable horizontal articulations of interdependent actors, who interact through negotiations that take place within a framework that is self-regulating (within limits), and that contributes to the production of public purpose (Sørensen and Torfing, 2007). Network governance, then, builds on the stability of institutions, structures, and processes that are negotiated between various state and non-state actors and allow for their mutual coordination (Mayntz, 1993).

Network governance poses various issues, including how collective action is affected by patterns of resource dependences (Stoker, 1988; Benson, 1982), what tools of coordination better fit the hybrid (i.e., neither hierarchy nor market) features of networked organizations (Powell, 1990), and how public authorities can effectively steer networks towards the attainment of public goals (Lewis, 2011). As argued by Peters (2011a), network governance theory generally tends to explain network conduct on the basis of structural features of the network organization. This approach assumes that structural-configurational attributes of networks determine the patterns of interaction, while actors’ beliefs, preferences, and meanings are relatively less relevant (Klijn and Koppenjan, 2004). Institutions play a primary causal role in shaping how policy issues are considered, how they are tackled, and how they are evaluated (Weaver and Rockman, 1993).

This institutional or “modernist theory of governance”, as Bevir and Krupicka (2011) labeled it, is contrasted with an “interpretive” approach, which holds that individuals and their ideas affect governance in a fundamental way (Bever, 2010; Rhodes, 1997, 2007). According to this view, individuals affect governance in relation to the particular ways in which they conceive the decision

situations, devise alternative options available, and formulate courses of action to undertake. These ideational and interactive performances of network actors cannot be explained by recourse to structural features of the network organization alone. Rather, we should consider how actors interpret rules and situations, how beliefs, preferences, and meanings are formed and changed, and how all this affects the reproduction or adjustment of the social practices that constitute the performative aspect of governance (Bevir *et al.*, 2003; Feldman and Pentland, 2003). Explaining governance issues, then, requires paying attention to the interpretations, discourses, and narratives about governance within particular historical and cultural contexts (Bevir and Rhodes, 2010, 2004, 2006; Rhodes 2009).

The “interpretive” approach has been criticized by Peters (2011b), who seemed skeptical of the view that “the individuals involved in governance appear unconstrained by the institutions within which they function or seemingly by other social bonds” (Peters, 2011b: 468). To scholars like Peters, the interpretive approach does not fully account for how multiple interpretations are integrated and aggregated into shared and stable patterns of interaction. In addition, the interpretive approach downplays the role of institutions in shaping individuals’ understanding of situated interactions, in framing the range of options choices available, and in driving the behavior of individuals along permissible patterns. Peters (2011b: 469) acknowledges that ideas are important in individual conduct, but he contends that they are typically “endogenized into the institutions (public and private) involved in governance”.

When Peters (2011b) referred to ideas having been “endogenized into the institutions involved in governance”, he implicitly located governance within a relatively stable scenario, where institutions embody the signifiers of the hegemonic discourse that sustains the reproduction of a given social order. Within such scenario, as he wrote, “there is no particular necessity to understand all the interpretations that the actors may have of institutional values. Rather those norms are assumed to be operative and to shape behavior if indeed the institution is successful (Peters, 2011b:

469). Accordingly, he contended that research on governance should be primarily based on mapping the organizational and institutional aspects of governing, that should contain enough information for the researcher to “tell the story that needs to be told” without the need for delving into the details of the beliefs, preferences, and meanings held by individual actors or their coalitions.

A limitation of Peters' critique to the “interpretive” approach is that it seems ill equipped to cope with issues that arise when change factors threaten the stability of established governance practices and regime. This kind of scenario is contemplated by Rhodes (2007: 1253), who argued that individuals or groups face a dilemma when “a new idea stands in opposition to existing beliefs and practices and thereby forces a reconsideration of existing beliefs and associated traditions”. Dilemmas entail that decisions made within the policy-making and implementation process may deviate from the established patterns dictated by the institutionalized order (Newman, 2005). As such, dilemmas open up the possibility that interpretations, discourses, and narratives need to be taken into consideration for adequately explaining the interaction between existing governance practices and regime and novel ideas, and how this interaction results in changed systems of governance. The study of governance, then, should not easily dismiss the importance of a “decentred analysis” (Rhodes, 2007; Bevir and Rhodes, 2003, 2006), where researchers are advised to pay attention to beliefs, preferences, and meanings of the actors involved in a particular policy domain in order to explain the creation, reproduction, and modification of institutions and institutional order.

Technological change is a kind of change factor that can threaten the stability of established governance practices and regime. The origin, dynamics, and effects of technological change and its relationship to public policy have been subjected to extensive scholarly inquiry (Dosi, 1982; Etzkowitz and Leydesdorff, 2000; Stoneman and Diederer, 1994; Winter and Nelson, 1982). For instance, developments in ICT resulted in complex and uneven adjustments in public administrative



systems that marked the beginning of the so-called “digital-era governance” (Dunleavy *et al.*, 2005). The process through which a source of technological change affects the understanding of actors about the role of the new technology and its impact on the policy domain, however, has been little researched so far. According to the “interpretive” view of governance, the beliefs, preferences, and meanings that actors attach to the new technology are important in order to explain whether and how technological change may affect established governance practices and regime. When these ideas interfere with existing patterns of interaction, they may give rise to dilemmas as to whether technological change can be reconciled with the institutionalized order or whether it brings about a fundamental shift with respect to established practices and regime.

### **3. Research Method.**

This paper aims to contribute to the “interpretive” theory of governance by focusing on the role of ideas about the emergence of a source of technological change – namely, Big Data – in the governance practices and regime of a particular policy domain – namely, ICT in public administration. As both a technological and social phenomenon, Big Data have been variously defined. A common thread describes them as those data that cannot be analyzed using traditional processes or tools (Eaton *et al.*, 2012; Manyika *et al.*, 2011; Marzetta, 2012). According to a more refined interpretation, Big Data are the production and analysis of data that are characterized by large volume, rapid velocity (i.e., real-time or nearly real-time information), and sheer variety (i.e., formats that include text messages, images, readings from sensors, GPS signals, and more, and that originate from laptops, smart phones, tablets, and other devices), that require new forms of processing to enable enhanced decision making, insight discovery and process optimization (Beyer and Laney, 2012; McAfee and Brynjolfsson, 2012). Others, instead, highlight that the distinctive feature of Big Data relates to its content focused on people's behavior rather than on their beliefs (Edge, 2012).

The particular “take” of governance theory in the “interpretive” approach entails that researchers should primarily focus their empirical efforts on detecting actors' beliefs, preferences, and meanings rather than mapping the organizational and institutional aspects of governing. In this respect, timing of observation is crucial: if researchers are interested to understand whether and how new ideas come to challenge the established governance practices and regime, then ideally they should collect data within the temporal context when these ideas emerge and dilemmas about how they can be reconciled with the institutionalized order are posed. If data about new ideas are recollected from actors' memory at later stage, instead, researchers may be skeptical as to whether actors expose a fair account of their past mental states or if they rather provide ex post reconstructions of beliefs, preferences, and meanings that may bear scant resemblance to their original mental states. Accordingly, data collected (too long) after the dilemmas of reconciling new ideas and existing practices have been tackled may not adequately illustrate the complexity and nuances of actors' understanding of the challenge posed by new ideas to established governance practices and regime. In practice, data collection efforts often try and elicit actors' memory for describing past mental states. However, researchers can detect a richer account of actors' beliefs, preferences, and meanings if they timely interview actors when the emergence of new ideas has not been accompanied by any reconciliation or adjustment with existing practices yet.

The rise of Big Data within the public and policy discourse provides a relevant and opportune instance of new ideas that challenge established governance practices and regime. How is the role of Big Data understood from the side of the policy community organized around the use of ICT in public administration? How do they think that Big Data and their production, analysis, and use should be regulated? In order to answer these questions, the present study employs Q methodology (Stephenson, 1953; Brown, 1980) for identifying different viewpoints that practitioners of ICT in public administration hold about this topic. This study, then, enables to detect actors' beliefs, preferences, and meanings of the role of this new technology and to draw

some inferences on the kind of dilemmas that Big Data pose with respect to existing governance practices and regimes of ICT in public administration. While this research design obviously does not allow to explain whether and how new ideas result in the reproduction or adjustment of social practices, nevertheless it enables to capture part of the interpretations, discourses, and narratives that, within a particular temporal context and policy domain, put the stability of the institutionalized order into question.

Q methodology requires each participant of a population sample (P sample) to sort a series of statements (Q sample) that are considered representative of the breadth of the discourse around a topic or issue (the so-called *concourse*) (Brown, 2004; Dryzek and Berejikian, 1993). In the present study, the Q sample was constructed on both empirical and theoretical ground. Sentences about Big Data, the expected role of Big Data, and policy positions about the regulation of Big Data were collected from various published works and media sources (referenced in next section). Then, sentences were arranged and synthesized around four categories formulated in relation to general views about technology in the public sector (Margetts and Dunleavy, 2002; Schwarz and Thompson, 1990), namely the “technology benign” (i.e., technology is forgiving and any disruptive force will be accommodated), “technology ephemeral” (i.e., technology is uncompromising and any innovation will lead to radical shifts), “technology perverse or tolerant” (i.e., technology is resilient but also vulnerable to shocks), and “technology” capricious” (i.e., technology is haphazard and it will expand towards unforeseen directions), and to alternative culture views, namely individualist, hierarchist, egalitarian, and fatalist (Hood, 1998; Douglas, 1982). The resulting Q sample consisted of 24 statements.

The P sample was purposively selected from an instance of a policy community organized around the use of ICT in public administration (P samples are typically constructed on naturalistic or demographic criteria with the aim of “capturing” enough variety of views on the given topic or issue; Jeffares and Skelcher, 2011). Identifying such policy community required to fulfill search

criteria that included expertise in ICT, expertise in public administration, and an interest towards contemporary policy issues. As a way of satisfying these requisites, invitations to participate to the study were sent to 28 individuals drawn from members of the “Open Data” group within “*Innovatori PA*” (Innovators of Public Administration), a social network of public employees and public sector consultants promoted by Formez (a training agency for the public sector owned by the Italian Government).

Sorting was performed online (through FlashQ; Hackert and Braehler, 2007) in April and May 2013 by 15 respondents (54% return rate), who aged 46 on average (median 45) and possessed 17 years of experience in ICT in public administration on average (median 16). The Q sort had the shape of a normal distribution with values ranging from -4 to +4. The distribution of statements (the Q sort) was analyzed through a by-person factor analysis to reveal correlated groups of statement preferences. The results of the analysis, in the form of features of synthesized factors, were interpreted by the researchers into meaningful categories to illustrate alternative viewpoints on the topic or issue at hand (Yanow and Schwartz-Shea, 2006; Mathur and Skelcher, 2007).

#### **4. The Analysis of Ideas about the Governance of Big Data.**

The construction of the Q sample begun with the review of published works and media sources on Big Data, the expected role of Big Data, and policy positions about the regulation of Big Data. The review included works that highlighted the opportunities that Big Data were expected to bring about to society in general and to the public sector in particular. Some authors highlight that Big Data allow to create value through sophisticated data analysis (Kiron and Schockley, 2012; LaValle *et al.*, 2011) and to make policy-making more agile and effective (Global Pulse, 2012). Others contend that Big Data hold the promise of various process and service innovations in the delivery of public services in areas such as predictive policing, fraud detection, tax collection, fraud detection, weather, epidemiology and healthcare, scientific research, transport, and education.

Evidence that Big Data can indeed impact onto social practices in radical way, and in the public sector in particular, is relatively thin so far. Early applications of Big Data in the public sector include, for instance, predictive policing implemented in the US (Los Angeles and Santa Cruz, California; Ferguson, 2012; Greengard, 2012) and the UK (Kent Police; Asquer, forthcoming), fraud detection in Australia (Centrelink; Milakovich, 2012), and school performance in the US (Atlanta; LaValle *et al.*, 2011). Future developments may include systems for tracking policy implementation, monitoring social trends and unveiling unexposed social patterns, and assisting policy-makers and regulators through systems that provide early warnings, real-time awareness, and real-time feedback (Global Pulse, 2012).

Other works, on the other hand, highlight that Big Data also pose challenges and issues. As an information resource, Big Data are produced and stored in multiple organizations of both the public and the private sector, such as banks, insurance firms, telephone corporations, and Internet companies (especially social networks and search engines) (UN, 2012). Access to these resources enables to perform various sorts of computations that may result in valuable information, but that also pose the threat of misuse, manipulation, infringement of privacy, and even intrusion into individual freedom (Bollier, 2010; boyd and Crawford, 2012). Manovich (2011) warned that the rise of Big Data is accompanied by the creation of two classes – namely, those who have the means to collect them and those who have the expertise to analyze them – that could potentially exploit a third one made of those who just create them (both consciously and unintentionally, especially by leaving “digital footprints” behind).

Big Data, then, has entered the public and policy discourses in late 2010's with mixed utopian and dystopian connotations. Some authors have highlighted that Big Data could allow resourceful actors to circumvent existing regulatory systems and policies (Milakovich, 2012). Others have argued that Big Data opens up plenty of scope for improving public services (Foresight Future Identities, 2013), especially if organizations collaborate to share their data base and make

them available to the public (i.e., “data philanthropy; Kirkpatrick, 2013) and if the governments act as “catalysts” for value-creation initiatives (World Economic Forum, 2012). Others have pointed out that, like other experiences of ICT tools in the public sector (Cordella and Iannacci, 2010; Dazinger and Anderesen, 2002; Moon, 2002), Big Data may deliver modest results, if they are not accompanied by the supply of adequately trained staff, incentives for innovators, updated infrastructure, and communication strategies intended to tackle sources of public concerns with safety, security, and privacy. The public and policy discourse around Big Data, then, contains ideas that, in part at least, call for the design of novel organizational and institutional arrangements that help regulating the collection, storage, sharing, analysis, and use of Big Data, from the side of both public and private actors.

Building on the review summarized in the previous paragraphs, ideas about the role of Big Data were arranged and synthesized around a four categories that related to alternative views of technology or cultural values. The resulting Q sample is illustrated in Table 1.

< Insert Table 1 about here >

The 15 Q-sorts were analyzed through a principal component analysis followed by varimax and then judgemental rotation to account for as many of the sorts as possible in as few factors as possible (Stricklin and Almeida, 2001) using PQMethod (Schmolek, 2012). At the end of the analysis, three factors were selected because they had two or more people (Q-sorts) loading significantly on each factor (Watts and Stenner, 2005). The three factors explained 61% variance in total. In addition, the selection of three factors resulted theoretically informative as they related to meaningful alternative viewpoints of Big Data in public administration. Only one person (Q-sort) did not significantly load to any factor, possibly because of being an outlier or because of holding unresolved views on the topic. Table 2 shows the factor matrix with defining sorts and Table 3

illustrates the factor scores and corresponding ranks.

< Insert Tables 2 and 3 about here >

The first of the viewpoints on Big Data in public administration relates to what we can call a “Pragmatic” view. A pragmatic view of Big Data tends to agree that Big Data offer opportunities to better reach all users of public services and tailor services to their needs, and that initiatives in this area can succeed if they show how they can solve individual practical tasks. While initiatives should be adopted by following formal and explicit guidelines, the public sector should not be afraid to allow trials and errors when adopting Big Data. Moreover, pragmatists tend to agree that Big Data are not just a matter under the domain of IT specialists, although they expect that the introduction of Big Data in the public sector will be hampered by the sunk cost of existing IT infrastructure.

The second viewpoint relates to what we can call a “Skeptical” view. Followers of this perspective tend to acknowledge that Big Data are a serious challenge and should not be easily overlooked. However, they also agree that Big Data may be just a technological fad and miss delivering efficient or effective solutions, that Big Data do not necessarily imply better service quality, and that the introduction of Big Data in the public sector might rather serve the purpose of strengthening governmental tools of social control of the masses. They suspect that the public sector will not be significantly affected by Big Data anyway, for reasons that include that the introduction of Big Data in the public sector will be hampered by the sunk cost of existing IT infrastructure.

The third viewpoint on Big Data in public administration relates to what we can call a “Cautious” view. A cautious view tends to agree that Big Data offer opportunities to better reach all users of public services and tailor services to their needs, but also that the introduction of Big Data does not necessarily imply better service quality and bears the risk of excluding or marginalizing everything that is not digitalized. Followers of this perspective especially believe that the public

sector should not loosen its tight regulatory and control systems while adopting Big Data and that Big Data initiative should be adopted by following formal and explicit guidelines. They also agree, however, that the introduction of Big Data in the public sector will be hampered by the sunk cost of existing IT infrastructure.

It is interesting to notice that the three viewpoints highlight different dimensions of the multi-faceted role that Big Data can play in public administration. With respect to the grid-group dimensions provided by cultural theory, each of the three viewpoints seems characterized by mixed sets of values. Pragmatists tend to especially exhibit agreement with statements that have been conceived as related to an individualist cultural perspective, such as those about the relevance of solving individual practical tasks, the tolerance for trial and errors, and the importance of adequate incentives. The skeptical view seems especially informed by a fatalist cultural perspective, that relates to statements about considering Big Data just an ineffectual technological fad, a tool of governmental control of the masses, and a technology that may affect the public sector in unpredictable ways. Finally, the cautious view seems equally inspired by an egalitarian perspective, that is concerned with the opportunities to reach all users of public services and tailor services to their needs and with the risk that the introduction of Big Data may exclude or marginalize everything that is not digitalized, and a hierarchical one, that relates to the claims that the public sector should not loosen its tight regulatory and control systems while adopting Big Data and that Big Data initiatives should be adopted by following formal and explicit guidelines.

The three viewpoints seem conceptually distinguishable from each other, although they also present some degree of overlap. Any individual who subscribes to either the pragmatist, skeptical, or cautious viewpoints would agree that the introduction of Big Data in the public sector will be hampered by the sunk cost of existing IT infrastructure (thus, in a sense, shared beliefs include a role for the stability of organizational routines already in place). Individuals also generally tend to reject the statements that Big Data pose some threats to security and consistency of public sector



activities and that the introduction of Big Data will call for greater regulation of the Internet in general (thus, in a sense, shared beliefs also include a role for the stability of at least part of institutions already in place). Individuals would also reject statements that Big Data need to gain the trust of citizens before they are successfully adopted in the public sector and that they may serve as a tool in the hands of the elite for the control of the communities (thus, in a sense, beliefs may also include a relatively modest role of Big Data in affecting relationships at the societal level). Closer “affinity” is found especially between the pragmatic and cautious views, as illustrated by the correlation Table 4.

< Insert Table 4 about here >

## **5. Conclusions.**

This study showed that the emergence of Big Data sparked the generation of ideas about the role of this technology in public administration and how it should be regulated. Based on a sample of individuals drawn from a policy community organized around the use of ICT in public administration in Italy (*Innovatori PA* network), the analysis allowed to identify three viewpoints about Big Data in public administration, namely a pragmatic, skeptical, and cautious perspective. While the three viewpoints share some commonality (e.g., followers of each perspective agree that the introduction of Big Data in public administration will be hampered by the sunk cost of existing IT infrastructure), they also exhibit distinctive features. For example, pragmatists tend to highlight that the new technology constitutes an opportunity to better reach all users of public services and tailor services to their needs, skeptics are inclined to agree that the new technology seems to pose serious challenges but also that it may result in a mere fad and miss delivering efficient and effective solutions, and cautious individuals are prone to think that the new technology does not necessarily imply better service quality and that it bears the risk of excluding or marginalizing

everything that is not digitalized.

The findings of this study bear some implications for our understanding of the impact of Big Data in public administration. In part, they show that the emergence of this technology and the prospect of its application within the realm of public administration stimulate a variety of beliefs, preferences, and meanings among the actors involved in the particular policy domain. In addition, they also show that the emergent discourse on Big Data in public administration develops within a cognitive “space” that includes a role for the stability of existing organizational and institutional systems. Ideas held about Big Data in public administration include the belief that the introduction of the new technology will be hampered by the sunk cost of existing IT infrastructure, and that it will not pose threats to security and consistency of public sector activities neither call for greater regulation of the Internet in general. The emergence of the new technology, then, is accompanied by the formation of beliefs that are consonant with the prospect of some continuity of existing governance practices and regime for the time to come.

In part, however, the findings of this study also suggest that, depending on the viewpoint towards Big Data in public administration, the emergence of this technology also poses some dilemmas. This may not be the case for those who hold a skeptical perspective, provided that they may easily dismiss Big Data as a technological fad that is not going to significantly affect public services. Followers of the pragmatic viewpoint, however, agree that the public sector should allow some experimentation with Big Data, also at the expense of potential mistakes. Adherents to the cautious viewpoint are concerned that Big Data poses the risk of marginalizing or excluding everything that is not digitalized, and they are inclined to recommend public administration to retain its tight regulatory and control systems. Both pragmatic and cautious individuals, moreover, would be in favor of the adoption of formal and explicit guidelines to orient the adoption of Big Data initiatives. The policy community of public employees and public sector consultants considered in this study, then, developed a discourse around the role of Big Data in public administration that also

included consideration for challenges, alternatives, and new policies that could be adopted in order to accommodate the new technology within the existing organizational and institutional systems.

The findings of this study also bear some implications for the theory of governance in general. With respect to the arguments made by the “institutional” and “interpretive” approaches to governance theory (Bevir, 2010; Bevir and Krupicka, 2011; Bevir and Rhodes, 2010, 2004, 2006; Peters, 2011a, 2011b; Rhodes, 1997, 2007, 2009), the findings of this study suggest some qualifications about the relationship between ideas and institutions, especially for tackling issues related to governance stability and change. The evidence provided by this study suggests that the institutional context should be taken into consideration for explaining actors' interpretation of sources of change. Far from taking place within a social and historical “vacuum”, the formation of beliefs, preferences, and meanings builds on taken-for-granted premises that may include the stability and resilience of existing organizational and institutional systems. Accordingly, the emergence of sources of technological change within a policy domain, as it may be the case of Big Data in public administration, is interpreted within conceptual frames where existing governance practices and regimes are presumably able to accommodate the novel stimuli that originate from the new technology. More generally, governance institutions may contribute shaping the ideas that actors develop about governance stability and change, also in ways that include disbelief that any outside factor may bring about any significant rearrangement of existing practices and regime.

The evidence provided by this study also suggests, however, that sources of change may set in motion a train of ideas that also include policy positions to rectify existing organizational and institutional systems. In a dialectical fashion, some of these ideas may be characterized by a “reactionary” stance (Hirschman, 1991) towards the source of change. Instances include lines of argument that follow the “futility” (e.g., Big Data may prove just next technological fad and miss delivering efficient or effective solutions), “perversity” (e.g., introduction of Big Data in the public sector will exclude or marginalize everything that is not digitalized), or “jeopardy” theses (e.g., Big

Data may pose some threats to existing public sector organizational systems and routines, and to some public employees' skills and know-how). Other ideas, instead, may be understood as intended to counteract those with a “reactionary” stance and to lay the foundations for policy initiatives. Instances include lines of argument that acknowledge the possibility of disruption brought about by the new technology and outline how to prepare to tackle risks (e.g., by calling for the adoption of formal and explicit guidelines for Big Data initiatives) and those that seek to demonstrate the returns from embracing change (e.g., by calling for tolerance for trials and errors when adopting Big Data initiatives). Attention to these interpretations, discourses, and narratives seem important, therefore, to grasp ways through which policy ideas form and may feed into a policy cycle intended to change governance practices and regime.

Finally, this study has some limitations that should be duly acknowledged. First, evidence about the perceived role of Big Data in public administration has been collected from a particular policy community (the Italian *Innovatori PA* network), whose viewpoints may be biased because of specific cultural and national characteristics. Second, the study does not deal with the issue of whether and how ideas about Big Data in public administration, that have been identified through the Q methodology study, play any role to stimulate and affect a policy cycle related to changing governance practices and regime of ICT in public administration for accommodating the sources of change that originate from the new technology. Third, the study could be supplemented by research on mapping the existing institutional and organizational domain of ICT in public administration within the specific country case as a way to clarify how both ideas and institutions contribute explaining sources of governance stability and change. Additional work could be done, then, for addressing these concerns and improving our understanding of governance practices and regimes.

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## Tables

Table 1. The Q sample.

<i>“Technology benign” Individualistic culture</i>	<i>“Technology perverse or tolerant” Hierarchical culture</i>	<i>“Technology ephemeral” Egalitarian culture</i>	<i>“Technology capricious” Fatalist culture</i>
Public administration will be able to optimize on the opportunities offered by Big Data.	Public administration will experiment to find how Big Data work for them.	Big Data will not significantly affect public administration.	Public administration will be unpredictably affected by embracing Big Data.
Public administration should not be afraid to allow trials and errors when adopting Big Data.	Public administration should not loosen its tight regulatory and control systems while adopting Big Data.	Public administration should be concerned that Big Data are not just a matter under the domain of IT specialists.	Public administration should bear in mind that Big Data do not necessarily imply better service quality.
Big Data initiatives can be stimulated by the competition between public sector agencies or departments to stay at the forefront of technological development.	Big Data initiatives in public administration should be centrally coordinated by governmental authorities.	Big Data offer opportunities to better reach all users of public services and tailor services to their needs.	Big Data may prove just next technological fad and miss delivering efficient or effective solutions.
Big Data initiatives in public administration can succeed if they show how they can solve individual practical tasks.	Big Data initiatives in public administration should be adopted by following formal and explicit guidelines.	Big Data may pose some threats to existing public sector organizational systems and routines, and to some public employees' skills and know-how.	Big Data may pose some threats to security and consistency of public sector activities.
Big Data initiatives in public administration will be adopted if there are adequate individual incentives for doing so.	Big Data are a serious challenge for the regulation of public administration and should not be easily overlooked.	Big Data need to gain the trust of citizens before they are successfully adopted in public administration.	Big Data in public administration may be a tool in the hands of the elite for the control of the communities.
The introduction of Big Data in public administration will be hampered by consideration for the sunk cost of existing IT infrastructure.	The introduction of Big Data in public administration will call for greater regulation of the Internet in general.	The introduction of Big Data in public administration will exclude or marginalize everything that is not digitalized.	The introduction of Big Data in public administration will strengthen governmental tools of social control of the masses.

Table 2. Factor matrix with defining sorts (indicated by X).

Q sorts	Factors		
	Factor 1 (“Pragmatic”)	Factor 2 (“Skeptical”)	Factor 3 (“Cautious”)
1	0.6472 X	0.0786	-0.26
2	0.6903 X	0.3658	-0.0109
3	0.2751	0.7459 X	0.2068
4	0.5285 X	0.3612	0.2132
5	0.0013	-0.0856	0.0232
6	0.8194 X	-0.2845	0.1738
7	0.5732	0.0582	0.8012 X
8	0.5732	0.0582	0.8012 X
9	0.5835 X	0.1964	-0.1707
10	-0.0182	-0.8446 X	0.0080
11	0.7006 X	-0.2775	0.1666
12	0.8375 X	-0.0412	0.2480
13	0.6289 X	-0.2531	-0.1553
14	0.8513 X	-0.0342	0.2517
15	0.7135 X	0.1299	-0.1905
% explained variance	38	12	11

Table 3. Factor scores and corresponding ranks.

No.	Statements	Factors					
		Pragmatic		Skeptical		Cautious	
		Score	Rank	Score	Rank	Score	Rank
1	The public sector will be able to optimize on the opportunities offered by Big Data.	-0.45	15	-0.77	18	0.00	14
2	The public sector will not be significantly affected by Big Data.	-1.14	20	1.03	5	-0.48	18
3	The public sector will need to experiment what features of Big Data work for them.	0.67	9	0.36	11	0.00	14
4	The public sector will be unpredictably affected by embracing Big Data.	0.77	7	0.61	8	-0.48	18
5	The public sector should not be afraid to allow trials and errors when adopting Big Data.	1.06	5	0.56	10	0.48	10
6	The public sector should not loosen its tight regulatory and control systems while adopting Big Data.	0.49	11	-0.92	20	0.96	6
7	The public sector should be concerned that Big Data is not just a matter under the domain of IT specialists.	1.40	1	0.56	10	0.48	10
8	The public sector should bear in mind that Big Data do not necessarily imply better service quality.	-0.47	16	0.82	6	1.44	3
9	Big Data initiatives can be stimulated by the competition between public sector agencies or departments to stay at the forefront of technological development.	0.51	10	-0.56	17	-0.48	18
10	Big Data initiatives in the public sector should be centrally coordinated by governmental authorities.	-0.48	17	-0.36	16	0.48	10
11	Big Data offers opportunities to better reach all users of public services and tailor services to their needs.	0.86	6	0.15	13	1.44	3
12	Big Data may be just a technological fad and miss delivering efficient or effective solutions.	-1.27	21	1.28	2	-0.96	21
13	Big Data initiatives in the public sector can succeed if they show how they can solve individual practical tasks.	1.16	3	0.05	14	0.48	10
14	Big Data initiatives in the public sector should be adopted by following formal and explicit guidelines.	1.10	4	0.20	12	0.96	6
15	Big Data may pose some threats to existing public sector organizational systems and routines, and to some public employees' skills and know-how.	-0.83	19	0.67	7	-0.96	21
16	Big Data may pose some threats to security and consistency of public sector activities.	-1.72	24	-1.69	23	-1.92	24
17	Big Data initiatives in the public sector will be adopted if there are adequate individual incentives for doing so.	0.70	8	-2.26	24	-0.96	21
18	Big Data is a serious challenge for the public sector and should not be easily overlooked.	0.29	12	1.33	1	0.00	14
19	Big Data needs to gain the trust of citizens before it is successfully adopted in the public sector.	0.09	13	0.00	15	-0.48	18
20	Big Data in the public sector may be a tool in the hands of the elite for the control of the communities.	-1.62	23	-0.92	20	-1.44	23
21	The introduction of Big Data in the public sector will be hampered by the sunk cost of existing IT infrastructure.	1.35	2	1.13	4	1.92	1
22	The introduction of Big Data in the public sector will call for greater regulation of the Internet in general.	-0.64	18	-1.08	21	0.00	14
23	The introduction of Big Data in the public sector will exclude or marginalize everything that is not digitalized.	-0.29	14	-1.33	22	0.96	6
24	The introduction of Big Data in the public sector will strengthen governmental tools of social control of the masses.	-1.53	22	1.13	4	-1.44	23

Table 4. Correlation between factors.

	Pragmatist	Skeptical	Cautious
Pragmatist	1.0000		
Skeptical	0.1143	1.0000	
Cautious	0.6502	0.2052	1.0000