

# Coproducing Quality Performance Information Through Institutional Design: Proposal for a Data Exchange Structure

Yun-Hsiang Hsu\*, Hae Na Kim\*\*, Jack Y. J. Lee\*\*\*

**Abstract** Quality performance information has been regarded as a significant step toward managing public performance. Although a correlation between the quality of information and its actual usage among managers in high-accountability policy areas has been found, quality performance information has not been properly provided to practitioners. This study takes an Institutional Analysis and Development approach to assess an appropriate institutional framework that facilitates state agencies and academics to coproduce this information. Based on a conceptual framework, we analyze a public information system of the Workforce Data Quality Initiative in Ohio and carry out a content analysis with NVIVO. It is found that arrangements that can manage the incentive dynamic in this process may help to align heterogeneous stakeholders in a mutually supportive fashion. Also, the research agenda and information resulted from being coproduced for management and academic purposes, simultaneously. This use of administrative data sheds light on how quality performance information can be coproduced under an appropriate institutional arrangement between administration and research communities. It is suggested that accessibility to the information system among various stakeholders should be improved.

**Keywords** Performance information, administrative data, Institutional Analysis and Development framework, Institutional arrangement, Ohio Longitudinal Data Archive

## I. Introduction

Advancing the use of performance information in public organizations has been critical to leading government reform (Kroll, 2015). Past reform in the field of performance management demanded public managers to use performance information efficiently and to inform citizens accountably of how the results of

---

Submitted, February 20, 2020; 1st Revised, April 20, 2020; Accepted, April 24, 2020

\* Institute of Law and Government, National Central University, Taoyuan, Taiwan; yhhsu@cc.ncu.edu.tw

\*\* Corresponding, Institute of Law and Government, National Central University, Taoyuan, Taiwan; hnkim@ncu.edu.tw

\*\*\* Department of Public Administration, National Open University, New Taipei, Taiwan; lyj@mail.nou.edu.tw



This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

those reform programs can be improved (Moynihan, 2008). The standards for managers in high-accountability policy areas are higher. Educators and training providers face greater pressure to use quality performance information. Regulations require managers to use timely resource allocation based on the application of complete, accurate, and valid information (Fozzard, 2001).

To respond to the demand for performance information, a series of data initiatives has been proposed by federal and state governments. These initiatives improve information accessibility among stakeholders, but raise the question of whether or not public managers can simultaneously facilitate the use of quality performance information in practice. Previous studies have searched for the answer to that question from the angle of performance management (Bourdeaux & Chikoto, 2008; Wang & Berman, 2001), data-driven policy making (Ikemoto & Marsh, 2007; Mandinach, Honey, & Light, 2006), cross-boundary information sharing, and open data (Dawes, 1996). Though the topics of quality performance information have been comprehensively discussed in public management scholarship, the focus has previously been more on the pitfalls of a one-size-fits-all practice (Frederickson & Frederickson, 2006; Kelly, 2002; Radin, 2006). During the Minnowbrook conference in 2008, this shortfall was noted, along with the question of what the values of performance information represented, and how the importance of disseminating this information could be highlighted (Moynihan et al., 2011). In this respect, open government literature has partly answered the value question, but not how to engage different stakeholders to produce and disseminate quality information.

Quality information is contextually appropriate to stakeholders (Wang & Strong, 1996); transparency without considering this aspect may be meaningless in providing government information for stakeholders in an Open Government (OG) environment (Dawes, 2012; Evans & Campos, 2013). There are previous attempts to integrate quality performance information, but the scope of previous studies was limited. We argue that neither perspective, performance management nor OG alone can fully explain how to integrate quality performance information in the era of innovation. A combination of the two can lead to progress and propel public management literature a step forward.

The purpose of this study is to address performance management and OG perspectives in an Institutional Analysis and Development (IAD) framework. IAD framework can help us identify the functioning approach when quality performance information is viewed as common goods in a data collaboration environment that government and research agencies work together. Specifically, we use Workforce Data Quality Initiative (WDQI) in the state of Ohio as our case to assess its effect. This study aims to evaluate the function of an institutional arrangement under this initiative in advancing the use among stakeholders, including a range of public and research agencies. We focus on the implementation and production of quality performance information in a

collaborative setting, with an intent to inform practitioners of the principles of usefulness and stewardship as proposed by Dawes (2010) in her conceptualization of work to balance tension in government information systems.

## **II. Theoretical Backgrounds**

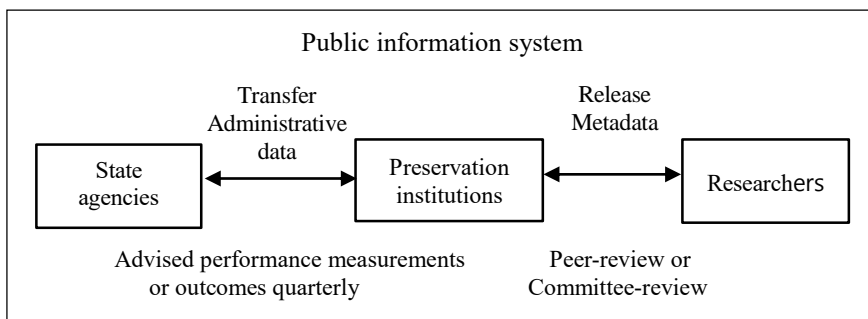
### **1. Quality performance information as commons**

Data initiatives facilitate collaboration among stakeholders in support of policymakers using quality performance information, however, the improvement of performance measurement requires a strong capacity for information technology and an inclusive public information system that can incorporate stakeholders' input (Berman, 2002). Engaging these stakeholders to system operation is not easy. Stakeholders may have different goals and interests, and their views on what value this collaboration can create might vary. Empirical studies suggest that fostering a sense of shared purpose among stakeholders continues to be a challenge for cross-agency information collaboration (Pardo, et al., 2008; Thorn & Meyer, 2006).

More importantly, this system cultivates a public image beyond management in the sector. Such metadata have not been served for management purposes, but have been extensively used by researchers in a series of education and workforce policy research. For an example, ninety-four research papers were produced between 1998 and 2012 based on administrative data collected under the Administrative Data Research and Evaluation (ADARE) project (Stevens, 2012). This substantial transparency in knowledge diffusion means that traditional evaluation framework in a public management information system, which categorizes the system by publicness or privacy, may not be assessed by this collaboration. We need to examine the nature of this public information system to align stakeholders and sustain service provision.

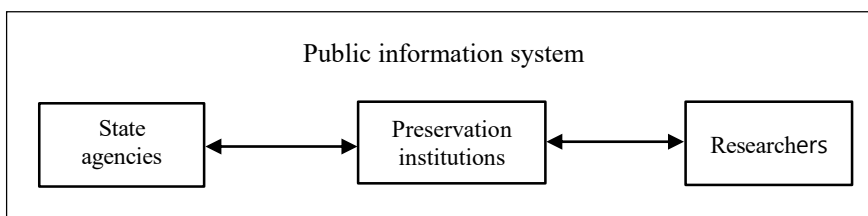
If we view quality performance information as the product of a value-added process of metadata in an information system, using metadata as input into information production and exchange processes shares some similarities with information commons (Benkler, 1998; Kranich & Schement, 2008). Access to information commons, like public metadata, is often limited due to laws regulating data stewardship. What distinguishes metadata from traditional commons is that this stock of man-made resources is claimed under government stewardship, in which recipients' privacy requirements are in place (GAO, 2011a). Regulation by the Family Educational Rights and Privacy Act (FERPA) limits education authority to the disclosure of metadata to a third party except

for evaluation purposes. Consequently, it is critical to this information enterprise to employ an institutional design that can induce stakeholders to generate useful information while maintaining governmental stewardship with innovations.



**Figure 1 (a) Stakeholders in public information system**

We may consider metadata as a stock of common-pool resources that needs to be collaboratively mined by heterogeneous stakeholders to unearth quality performance information. A commons-based framework can thus be applied to determine the appropriate rules that can encourage these stakeholders to jointly form and create a constant stream of quality or evidence-based performance information. Rules need to be put in place to resolve the tension between data decentralization and stewardship. Educating researchers on the purpose of this system is required, as they might generate information that is meaningful yet useless to state managers. The appropriate rules for these providers and policymakers can be divided into three levels – operational, collective choice, and constitutional choice – each of which can be considered a decision-making scenario.

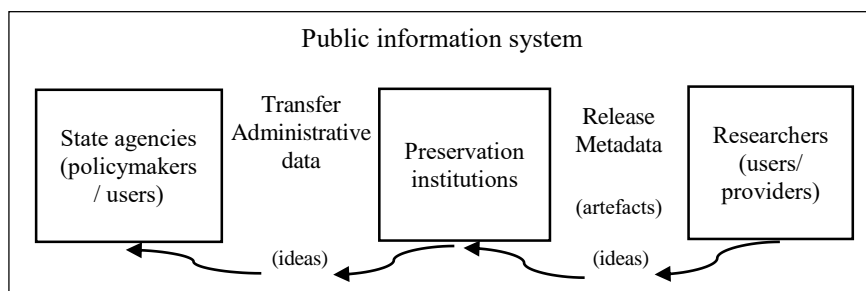


**Figure 1 (b) Design principles in public information system**

Specifically, operational choice rules are those that regulate who may access what parts of the metadata on a day-to-day basis. This facility may also set up rules to use a simple and stable submission interface that provides researchers with easy access. Also, collective choice rules for facilities are those dealing

with each facility's responsibilities as an institutional depository for metadata, such as the requirements in FERPA or the establishment of middleware and research agendas. Constitutional choice rules include a facility's relationship with government agencies at the state, cross-state, or federal level.

As noted by Ostrom (2007a, 2007b, 2011), rules are explicit forms used to govern relationships within a complex system. Stakeholders are usually nested within the rules that interact between these three levels. This analysis of system attributes, actors, and rules enables us to understand how values in performance management and principles in information transparency can be woven through a given set of rules into a system that aligns stakeholders toward producing quality performance information (OECD, 2018). We can dissect this value-added process through a multilayer framework that clearly identifies each factor in information production. Furthermore, this approach enables us to determine potential variables that affect an actor's incentives and actions.



**Figure 1 (c) Metadata as commons**

According to Hess & Ostrom (2007), the information production and exchange in a commons resource regime is fragmented and decentralized. The information system can first be distinguished into three types – facilities, artifacts, and ideas (Hess & Ostrom, 2003, 2007) – which represent institutional repository, metadata, and quality performance information, respectively. Facilities store artifacts and physical resources, and make them accessible to resource appropriators under certain conditions. When collecting quality performance information, preservation institutions serve as facilities that steward artifacts, whereas metadata is the artifact that requires researchers' development into ideas or information. These definitions clarify concepts related to resource regimes. We can dissect data collaboration into resource units and input them into the system being produced.

As for the heterogeneous stakeholders within this collaboration, three roles need to be further defined: information users, providers, and policymakers. The users, researchers, and state managers are those accessing metadata or quality performance information. Making metadata or information accessible can be

categorized. Therefore, preservation institutions and researchers can be viewed as providers. The policymakers, such as state agencies or advisory committees for data initiatives, regulate this collaboration.

One feature of this data collaboration is decentralization. Decentralization ensures no single person has exclusive control over resource ownership (ILO, 2001). Potential contributors' motivation to participate is bolstered and the cost of knowledge diffusion is minimized. For example, researchers will be more willing to contribute knowledge related to public programs because they can claim their fair share of contributions based on the metadata released to them. For state managers, the cost to communicate program evidence to legislators or the public can be minimized because researchers will diffuse it through diverse channels like publications. However, this decentralization may require us to assess an appropriate institutional design for aligning stakeholders to produce quality information.

## **2. Coproducing quality performance information**

In the United States, public managers are expected to use quality performance information under the current Government Performance and Results Act (GPRA) and Program Assessment Rating Tool (PART) regulations. Empirically, public managers have strong incentive to enhance credibility in performance measures by tailoring these measures specifically to the service goals of a specific program or activity in order to gain budget support from legislators (Wang, 2008; Lee & Wang, 2009). However, a specific and meaningful measurement require quality research and information collection, a process in which managers may lack support from their staff. This demand for quality information makes a strong case for public managers to collaborate with research institutions, often under different data initiatives. The pitfalls of performance information use among practitioners previously led to a reflection on what needs to be measured in public programs (Sylvia & Sylvia, 2004). We thereby look through the practitioner lens to identify the production and working definition of quality performance information.

## **3. Quality performance information: performance management and open government perspectives**

Two competing perspectives, which are process-oriented and system-oriented, are presented when scholars try to understand the meaning of quality performance information and help practitioners to achieve high standards:

### **3.1 Performance management perspective from process-oriented angle**

Quality performance information can be conceptualized as the product of a value-added process that leverages expertise and capacity from a wide range of stakeholders, ranging from public managers, staff in different programs, and researchers.

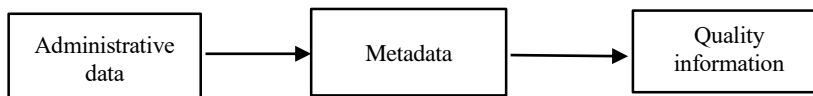
Quality performance information transfers the dataset into metadata that can be contextually understood, then into scientific-based evidence (GAO, 2010; Hawley & Hsu, 2012; Stevens, 2012; Thorn & Meyer, 2006). The mission statement for What Works Clearinghouse (WWC) clearly exemplifies what quality performance information is: “a central source of scientific evidence for what works in education.” This aligns rigorous and relevant research, evaluation, and statistics with the nation’s education system for management and decision-making. In other words, quality performance information is being scientifically produced through a rigorous process.

### **3.2 Open government perspective from system-oriented angle**

However, quality performance information is also a synergistic use of existing administrative data across agencies. This cooperation is facilitated by engaging stakeholders with public data (Walker, Lee, James, & Ho, 2018). The perspective of a public information system is needed to understand how quality performance information is being produced. “Public information system” here refers to a system that encompasses environmental constituents external to public organization (Bozeman & Bretschneider, 1986). From a system-oriented perspective, quality performance information can be the response of a public information system to increasing demand for evidence of program effectiveness.

The process is consisted of two steps. The first step is to re-describe the original data content into universally comprehensible metadata. This involves data reshaping, de-identification, and documentation, with institutions capable of data manipulation. These institutions serve as data repositories for public metadata. Secondly, the metadata needs to be translated into evidence.

The institutions that store metadata release it to researchers, who can use it to answer key research and evaluation questions related to program performance outcomes. This whole process contributes to the information that guides policy making.



**Figure 2** The transformation process from administrative data to scientific evidence

The value of administrative data requires stakeholder engagement and innovative analysis. Engaging stakeholders in the collection of quality performance information is important for data analysis. The importance of this engagement comes from two design principles – data stewardship and usefulness – stressed in government information policy literature (Dawes, 2010) as Table 1. On the one hand, the stewardship of data is best done by institutions (Lynch, 2008). Administrative data may come from different agencies, public managers, or staff. Institutions can be more fruitful and efficient in terms of program management if they engage with data accuracy, validity, security, management, and preservation. On the other hand, “quality” is not just used to refer to the quality of information itself, but also the usability of information (Dawes, Pardo, & Cresswell 2004). In quality performance information, this usability is facilitated through disciplinary engagement between researchers and preservation institutions (Friedlander & Adler, 2006; Stevens, 2012) in the form of data collaboration in the fields of education and workforce development research.

**Table 1 Principles in the data management of open government**

Principle	Outcomes
Stewardship	Standards and interoperability of metadata (good stewardship)
Stewardship	Compliance and participation of researchers (seed grant)
Stewardship	Access control to public metadata (data stewardship committee)
Usefulness	Collective research agenda (consultation with stakeholders)
Usefulness	Quality performance information (usefulness: integral part of program evaluation and strategic plan)
Usefulness	Cooperation and reciprocity between state agencies and academic community

Source: Dawes (2010).

Clearly, these two principles govern the structure of collecting quality performance information and regulating how stakeholders engage themselves in this value-added process.

### **III. Methodology**

This case study is an exploratory analysis applying IAD framework to assess the impact of institutional design for a commons model that can unify a group of heterogeneous stakeholders toward shared purposes and goals. This framework was developed by Ostrom (2007a) and other institutional scholars analyzing appropriate rules or institutional designs for common-pool resource regimes. When the purpose and goals of a resource system are to generate



knowledge or innovation, Benkler (2003) contends that the commons model outperforms other types of property regimes in terms of effectiveness and efficiency for its decentralization. We further this model by viewing metadata as a stock of common-pool resources and try to assess appropriate institutional arrangements among state agencies, preservation institutions, and researchers for producing quality performance information more innovatively and efficiently.

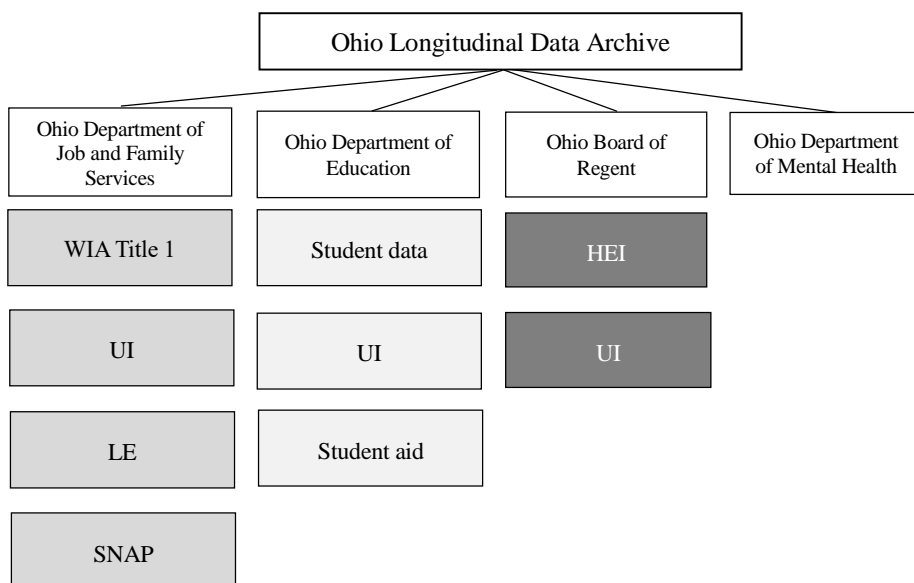
In particular, this study is based on the content analysis with a large dataset using NVIVO which is different from previously similar studies mainly based on specific sector (e.g., Kim, Johansen & Zhu, 2019; Ballard, 2019) or region (Lee, 2019). With the content analysis, we analyze our data document, including meeting minutes among these agencies and legal agreement to transfer data among various agencies. They are sampled by purposive typical case sampling method. In this study, we analyze various document and the code we identified through NVIVO is checked with diverse agencies to enhance our data credibility. While previous studies utilized ANOVA (Cha & Park, 2018) or t test (Lee, 2019), we implement the content analysis to provide more in-depth analysis for the WDQI.

## **1. Case**

The case we use for this study is the WDQI in the state of Ohio. The data source for analysis comes from public access information and reports. The stakeholders involved in the collaboration under the WDQI consist of the Ohio Department of Job and Family Services, Ohio Department of Education, Ohio Board of Regents, Ohio Department of Mental Health, and Center for Human Resource Research (CHRR) at Ohio State University. A legal agreement to transfer Higher Education Information, Workforce Investment Act Title 1 data, Labor Exchange data, Unemployment Insurance Wage Records, and social welfare data like that of the Supplemental Nutrition Assistance Program and Temporary Assistance Needed Family data to the CHRR has been completed between these agencies under the WDQI.

Under this agreement, the CHRR serves as an institutional depository for massive administrative data stores. The CHRR is also required to de-identify and re-describe these data into metadata in a relational database. The CHRR constructs data infrastructure via the Ohio Longitudinal Data Archive (OLDA; see Figure 3) to store metadata from the fields of higher education, unemployment, public training, welfare, and public health. This overarching archive aims to match unit record data on all individuals from different state agencies currently in the existing information. Two committees were formed accordingly to oversee data stewardship and research in this process. The archive crosslinks these metadata from different fields by its own identification

so that contributors can make sense beyond single data points and transfer data into programs for cost-benefit analysis or strategic planning. For example, the payoff of post-secondary education is a non-zero advantage in the labor market. The potential contributors, like the researchers, come from nine research institutions that have signed data-sharing agreements or delivered letters of intent to the CHRR, including Ohio University, Wright State University, Case Western Reserve University, Community Research Partner, and other universities outside Ohio. These institutions apply for the use of metadata in OLDA, and their applications are reviewed and approved by research advisory committees. The results are reported to state managers on a quarterly basis, forming an integral part of quality performance information used in evidence-based decisions.



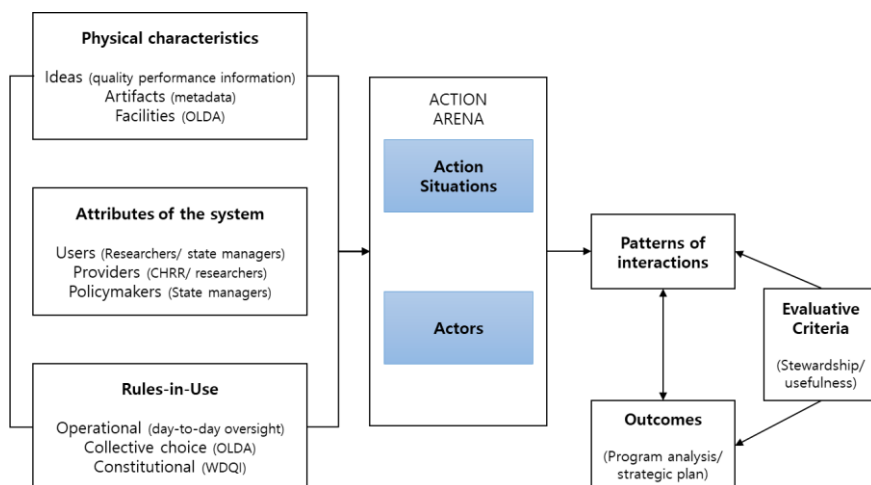
Source: Ohio Education Research Center (2012).

**Figure 3 Agencies and data structure in Ohio WQDI**

## 2. IAD framework

Collaboration can enhance the effectiveness of data-sharing practices, but the understanding of its impact on program outcomes tends to be limited due to lack of an appropriate framework to assess expertise in this process (Harrison et al., 2012). As Noveck (2009) points out, “the emphasis is not on participation for its own sake but on inviting experts, loosely defined as those with expertise about

a problem, to engage in information gathering, information evaluation and measurement, and the development of specific solutions for implementation” (p. 39). In this sense, IAD framework can represent the participation of state managers, database technicians, and researchers in this practice. We apply this framework to decompose data collaboration in the WDQI into physical characteristics, system attributes, and three levels of rules-in-use with the goal of diagnosing effectiveness and potential problems (See Figure 4). Participants in the collaboration will interact in an action arena wherein they are affected by these physical, system, and institutional characteristics. This interaction will produce different patterns and outcomes, and then the evaluation criteria can be applied.



Source: revised from Hess and Ostrom (2007)

**Figure 4 IAD framework**

## IV. Findings

We dissect the value-added process in data collaboration under the WDQI into the following components from physical characteristic, system attributes, three levels of rules-in-use, patterns of interaction, evaluation criteria to evaluate the outcomes of this data initiative in the final section.

## **1. Physical characteristic**

We distinguish the physical characteristics in information commons by facility, artifact, and ideas. The facility here refers to OLDA, which is part of the CHRR and is under its maintenance. The technicians in the CHRR load the original administrative data received from four different state agencies into the relational database system. Then, they run the value-added data through two interfaces, effectively de-identifying and re-describing it into metadata with documentation.

Regarding these two steps, the first is meant to design and the second to investigate. The design step de-identifies and documents administrative data into metadata, and the investigative step allows users to browse and extract the stored metadata. Each step serves a purpose (CHRR, 2012): The first enables data technicians to de-identify unit records in administrative data and assign them system IDs in a batch fashion so that they can deal with over 500 million records and cross-link them across different data sources. The investigative step then allows researchers outside the CHRR to simultaneously access this value-added metadata in a controlled and multi-user environment. An approved researcher can draw variables across different sources of metadata suitable to his research proposal during the investigative step. The metadata here are the artifacts cultivated by the CHRR. Under this cultivation, researchers can understand the context of original administrative data and convert it into quality performance information.

## **2. System attributes**

The actors in this information commons are those who directly or indirectly participate in forming quality performance information, and consist of users, providers, and policymakers. Actors can have more than one identity depending upon the scenario. State managers act as policymakers supervising the dissemination of public metadata while also being users of quality performance information (Kusek & Rist, 2004). CHRR members are users of administrative data, while also serving as providers of metadata to researchers. In a similar vein, researchers are users of metadata as well as the providers of quality information. These actors form a chain relationship between each other; the output of each actor relies on the input from others. Reciprocity plays an important role in making these commons more productive in terms of disseminating quality information. As noted in CHRR's focus group report, "There is a strong interest (among state managers) in understanding cross-program client behaviors and outcomes; however, data access restrictions limit such inquiries. The Ohio Longitudinal Data Archive holds linked, but de-identified records from multiple

state agencies, enabling holistic analyses that respect privacy regulations.” (CHRR, 2013)

This implies that state managers are more willing to utilize resources if they can foresee the CHRR’s role in facilitating the cross-program comparison, which happens to be the strength of this specific research center. This observation also confirms Pardo et al.’s (2008) findings regarding governmental data-sharing, which assert that this endeavor can be more productive if a reciprocal relationship can be constructed.

### **3. Three levels of rules-in-use**

A three-level structure is exhibited in the information commons facilitated by the WDQI, in which the actions and decisions among actors are communicated across different levels. The WDQI created the constitution that forms the overarching legal framework of information commons. This initiative encourages collaboration between state agencies and research institutions for the purposes detailed below:

- “1. Develop and improve state workforce longitudinal data system;
2. Enable workforce data to be matched with education data;
3. Improve the quality and breadth of the data in workforce longitudinal data systems;
4. Use longitudinal data to evaluate the performance of federally and state-supported education and job training programs;
5. Provide user friendly information to consumers to help them select education and training programs that best suits their needs.” (DOL, 2013b)

Under this constitution, state agencies sign legal agreements with the CHRR regarding data transfer and deliverable items at the collective choice level as below:

- “1. Developing an archive of data from ODJFS and the Board of Regents at OSU;
2. Establishing the middleware schema for documenting the data;
3. Setting up research agenda for use of the Ohio data; and

4. Producing operational, evaluation, and research reports.” (DOL, 2013a)

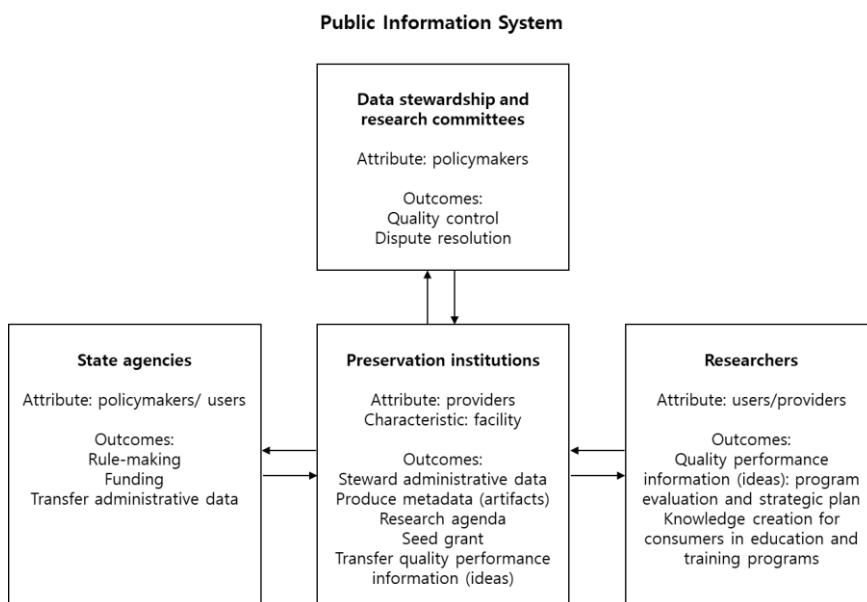
To deliver the outcomes in a timely fashion, two advisory committees – data stewardship and research – were formed within OLDA under the CHRR to oversee daily activities at the operational level. These committees regulate the membership in this information commons and decide who has the right to access each part of the public metadata. Punishment is set in legal agreements regarding those members who violate the security rules in metadata use. Seed grants are also provided at this level as incentives for potential contributors to devote their efforts to the research agenda, which contains the results of interactions between state agencies and the CHRR at the collective choice level. These results are further discussed in the outcomes section.

#### **4. Patterns of interaction**

The patterns of interaction in this information commons are affected by physical characteristics, actors, rules-in-use, and incentives/punishments in active situations, as illustrated in Figure 5. State managers, data technicians, and researchers are aligned by different levels of rules, in a top-down fashion, toward developing quality performance information from metadata at an operational level. A polycentric governance structure can be found: CHRR technicians oversee data stewardship under the commission of state managers, and researchers oversee knowledge creation from commissioned metadata. Each has its own political order, but they are interrelated. A key component of a polycentric governance system is that social actors face an array of provisional decisions in an active situation (McGinnis, 2011). They have the luxury of discretion to decide how much effort they will commit to each part of the service. This polycentricism is at odds with the traditional public service model (McGinnis & Ostrom, 2012), which, if quality is key, implies this governance structure requires policymakers to design a delicate incentive mechanism to replace the role bureaucracy has played in service delivery.

As for an incentive mechanism, federal funding at the constitutional level and seed grants at the operational level are in place to encourage contributions from academic institutions and researchers. State agencies are long overdue for a solid evaluation and strategic plan to convince legislators of their effective use of public funds (Wang, 2008), while the academic community looks forward to accessing administrative data in order to create knowledge (Mueser et al. 2007). Quality performance information also can influence stakeholders’ interpretations about performance information (Baekgaard and Serritzlew, 2015) and can create a positive public image in which stakeholders, including parents and students, can be informed of scientific evidence in education and training

programs. These stakeholders can be exposed to information regarding payoffs of these investments, which are more than often costly and lengthy, before making decisions. To harvest all these public goods, a research agenda is set at the collective choice level after consultation with state managers and research committees.



**Figure 5 Action situation in quality performance information**

## V. Results

The criteria we apply to evaluate the interactions and outcomes are data stewardship and usefulness, which are proposed by Dawes (2010) as overarching principles for information-based transparency within government activities: “Stewardship focuses on assuring accuracy, validity, security, management, and preservation of information holdings (p. 380).” Usefulness refers to whether “content of the information is helpful, beneficial, or serviceable to its intended users, or that the information supports the usefulness of other disseminated information by making it more accessible or easier to read, see, understand, obtain, or use” (Dawes, 2010, p. 380). An inherent tension exists between these two principles: They are simultaneously reinforcing and at odds with each other. The usefulness of metadata increases as the degree of decentralization that allows potential contributors to access resource from

different locations increases, as Benkler (1998) implied. But this decentralization poses a threat to the stewardship principle. However, standardized metadata developed under the stewardship principle can make resources more useful by facilitating innovations among stakeholders who participate in this process. A balance between these two principles can be found in our case study.

Six outcomes of the WDQI are being evaluated here, as illustrated in Table 2. If the results of this collaboration were that some information commons failed to deliver quality performance information, this data initiative would nonetheless be judged as a failure. From the outcomes we presented, the WDQI facilitated several positive outcomes and constructed a mutually beneficial relationship between state managers and researchers. Among these outcomes, a collective research agenda between state agencies and the CHRR is formed in which the prioritized items are deemed to be crucial to performance management practices and public interests. These items include those federal reporting requirements in GPRA and PART, as well as response to public inquiries on the return of education or training. This result has been achieved in a polycentric structure in which no central direction from public agencies has been given.

**Table 2 Positive or negative outcomes in information commons**

Principle	Positive Outcomes	Negative Outcomes
Stewardship	Standards and interoperability of metadata (good stewardship)	Lack of standards across metadata (degradation)
Stewardship	Compliance and participation of researchers (seed grant)	Noncompliance (not comply with the research proposal)
Stewardship	Access control to public metadata (data stewardship committee)	Loose and unlimited control
Usefulness	Collective research agenda (consultation with stakeholders)	Lack of mutual understanding on research direction
Usefulness	Quality performance information (usefulness: integral part of program evaluation and strategic plan)	Non (spam)
Usefulness	Cooperation and reciprocity between state agencies and academic community	Fragmentation

Source: Hess & Ostrom (2007).

As we see here, usefulness and stewardship as proposed by Dawes (2010) are found in the implementation and production of quality performance information



in a collaborative setting. From the evaluation of the function of an institutional arrangement, it is clear that the use among stakeholders, including a range of public and research agencies has been improved. In the government information system, quality performance information will be more enhanced in a collaborative setting among stakeholders. This indicates that public managers need to make sure that the principles of usefulness and stewardship when implementing and producing quality information system.

## **VI. Discussion**

The results of this study suggest that IAD framework can help identify a data collaboration environment, particularly for government agencies. With the application of the IAD framework, discovering the values from open data like WDQI will be easier to comprehend.

The quality performance information endeavor implies a fundamental change to the way research is conducted when using administrative data to answer performance questions. Through funding, state managers provide guidance for questions that can answer program performance to researchers on one hand (OECD, n. d.). Through cross-linking a variety of administrative datasets, data technicians in preservation institutions provide solutions regarding how the metadata can be produced to answer these questions. These questions are expected to be framed more toward management purpose. This collaborative use of metadata (artifacts) facilitates more tailor-made policy responses. However, this collaboration implies the research scope or focus that can be limited.

The innovative demand for the use of quality performance information in high-stakes policy areas has driven state agencies to seek an effective strategy that can engage stakeholders, with data and research capacity, in coproducing information for management usage. From the results of this study, it is clear that a successful research agenda is produced under cooperation among state managers, researchers, and data preservation institutions. This agenda aligns these heterogeneous stakeholders toward the coproduction of quality performance information, which simultaneously meets the expectations of diverse stakeholders.

This study contributes to an institutional explanation on how this information is coproduced by using IAD framework in the era of innovation. Also, the analysis of this IAD framework extends our understanding of the value of performance information and its usage in public organizations, which is a fundamental aspect that has been neglected in previous studies. In particular, the results of this study can provide more insights what OGs should consider in coproducing information within IAD framework.

This study is in line with the study by Ballard (2019) as it highlights how

public practitioners use information. The quality performance information endeavor implies a fundamental change to the way research is conducted when using administrative data to answer performance questions. Through funding, state managers provide guidance for questions that aim to explain program performance to researchers (OECD, n. d.). Through cross-linking a variety of administrative datasets, data technicians in preservation institutions provide solutions regarding how the metadata can be produced to answer these questions, which are expected to be framed more toward understanding management purposes. This collaborative use of metadata (artifacts) facilitates more tailor-made policy responses. However, this collaboration implies that the research scope or focus can be limited.

The innovative use of administrative data in guiding policy-making can be a double-edged sword. If properly leveraging the preservation institutions to steward the data in order to make it useful and transparent, state managers can advance their governability and gain legislative support by using quality information. This quality information can create a positive public image because the stakeholders are better informed via researchers' knowledge diffusion. Nonetheless, if we mismanage the data or leave the process opaque, public concerns over privacy will stifle innovation. Fear leads the public to overlook any potential benefits that new government ideas can create. The use of this vast amount of administrative data thus brings opportunities as well as challenges to the government.

As Pardo et al. (2008) argued, intra-governmental information sharing is more likely to succeed when all participants clearly and widely understand their roles and relationships. Serving as an exploratory framework to a polycentric governance structure more innovatively and efficiently, IAD identifies a set of rules, physical characteristics, and system attributes in the data collaboration facilitated by the WDQI. This has practical implications in guiding policymakers to design appropriate institutions or incentives that can reward and punish the contributors and violators. This framework skillfully bridges the gap between performance management literature and the OG perspective in the era of innovation, thus helping us to understand better public management and institutional analysis.

This study reveals the importance of stakeholders similar to the study of Lee (2019). The value of performance information use engages informed stakeholders to purposefully improve public service in an innovative way, resulting in stakeholders' contributions to the use of data to drive achievement among program participants. Under incentive mechanisms, a data collaboration consisting of state managers, data technicians, and researchers is formed to produce this information.

## **VII. Conclusion**

The key to leveraging massive administrative data to support this strategic planning is the provision of relevant metadata that enables researchers to access, understand, and carry said metadata into statistical analysis through quasi or non-experimental design. Stewardship and usefulness principles are applied in this process to deal with data linkage, interoperability, privacy, and confidentiality concerns (Dawes, 2010). Most importantly, we need to be concerned for privacy and mismanagement.

This study can provide more insights how the governments manage their institutional structure to engage stakeholders more effectively for data exchange innovations in terms of performance management and policy. It is suggested that public managers should express their needs in performance management more explicitly and help researchers in addressing privacy issues.

Although this study provides insights for the innovative use of administrative data in guiding policymaking, it has some limitations because of its focus mainly on Ohio. Therefore, it is cautioned to apply the results of this study to other states or other countries. Future studies may compare with other states or countries. Also, future studies need to focus on developing the public information system by adding an incentive dynamic in the process. This will help heterogeneous stakeholders' input be incorporated to the system in a mutually supportive way as the administrative data requires stakeholder engagement as well as innovative analysis. Improving accessibility to the information system among various stakeholders is necessary.

## References

- Au, W. (2011). Teaching under the new Taylorism: High-stakes testing and the standardization of the 21st century curriculum. *Journal of Curriculum Studies*, 43(1), 25–45. doi:10.1080/00220272.2010.521261.
- Baekgaard, M. and Serritzlew, S. (2015). Interpreting performance information: motivated reasoning or unbiased comprehension. *Public Administration Review*, 76(1), 73–82, doi: 10.1111/puar.12406.
- Ballard, A. (2019). Promoting performance information use through data visualization: evidence from an experiment. *Public Performance & Management Review*, 43(1), 109–128, doi:10.1080/15309576.2019.1592763.
- Benkler, Y. (1998). The commons as a neglected factor of information policy. *Paper presented at the Telecommunications Research Conference*, Alexandria, VA.
- Benkler, Y. (2003). The political economy of commons. *Upgrade: The European Journal for the Informatics Professional*, 4(3), 6–9.
- Berman, E. (2002). How useful is performance measurement. *Public Performance & Management Review*, 25(4), 348–351. doi:10.2307/3381127.
- Bourdeaux, C., and Chikoto, G. (2008). Legislative influences on performance management reform. *Public Administration Review*, 68(2), 253–265.
- Bozeman, B., & Bretschneider, S. (1986). Public management information systems: Theory and prescription. *Public Administration Review*, 46(November), 475–487.
- CHRR. (2012). Ohio workforce data quality initiative: Research data system and access. *Paper presented at the Advisory Meeting*, Columbus, OH.
- CHRR. (2013). Ohio analytics research agenda interview findings. *Paper presented at the Advisory Meeting*, Columbus, OH.
- Dawes, S. (1996). Interagency information sharing: Expected benefits, manageable risks. *Journal of Policy Analysis and Management*, 15(3), 377–394.
- Dawes, S. (2010). Stewardship and usefulness: Policy principles for information-based transparency. *Government Information Quarterly*, 27(4), 377–383. doi: 10.1016/j.giq.2010.07.001.
- Dawes, S. (2012). A realistic look at open data. *Paper presented at Using Open Data Workshop*. Retrieved from <http://www.w3.org/2012/06/pmod/presentation-dawes.pdf>, 4 December 2016.
- Dawes, S., Pardo, T. A., and Cresswell, A. M. (2004). Designing electronic government information access programs: A holistic approach. *Government Information Quarterly*, 21(1), 3–23. doi: 10.1016/j.giq.02 November 2003.
- Dillon, S. (2006). As 2 Bushes try to fix schools, tools differ. *The New York Times*. Retrieved from <http://www.nytimes.com/2006/09/28/education/28child.html>, 8 January 2017
- Department of Labor. (2013a). *Ohio's design plan*. Retrieved from <http://www.doleta.gov/performance/pfdocs/Ohio.pdf>, 15 February 2017.
- Department of Labor. (2013b). *Workforce data quality initiative (WDQI) orientation web meeting*. Columbus, OH.
- Evans, A. M., and Campos, A. (2013). Open government initiatives: Challenges of citizen participation. *Journal of Policy Analysis and Management*, 32(1), 172–185. doi:10.

1002/pam.21651.

- Fozzard, A. (2001). The basic budgeting problem approaches to resource allocation in the public sector and their implications for pro-poor budgeting. *Working Paper 147 Overseas Development Institute*, London, UK.
- Frederickson, D. G., and Frederickson, H. G. (2006). *Measuring the performance of the hollow state*. Washington DC: Georgetown University Press.
- Friedlander, A., and Adler, P. (2006). To stand the test of time: long-term stewardship of digital data sets in science and engineering. *Paper presented at ARL Workshop on New Collaborative Relationships Report to the National Science Foundation*. [Http://editlib.org/p/69918](http://editlib.org/p/69918). 1 April 2017.
- Government Accountability Office. (2010). Department of education: improved dissemination and timely product release would enhance the usefulness of the what works clearinghouse. *GAO-10-644. Report to Congressional Committees*. Washington DC: United States General Accounting Office.
- Government Accountability Office. (2011a). Postsecondary education: many states collect graduates' employment information, but clear guidance on student privacy requirements is needed. *GAO-10-927. Report to Congressional Committees*. Washington DC: United States General Accounting Office.
- Government Accountability Office. (2011b). *Managing for results: GPRA modernization act implementation provides important opportunities to address government challenges*. Washington DC: Government Accountability Office.
- Government Accountability Office. (2012). *A guide for using the GPRA modernization act to help inform congressional decision making*. Washington DC: Government Accountability Office.
- Government Accountability Office. (2013). *Unemployment insurance information technology: States face challenges in modernization efforts*. Washington DC: United States Government Accountability Office.
- Ginsberg, W. R. (2011). Obama administration's open government initiative: Issues for congress. *R41361. CRS Report for Congress*. Washington DC: Congressional Research Service.
- Harrison, T. M., Guerrero, S., Burke, G. B., Cook, M., Cresswell, A., Helbig, N., Hrdinova, J., and Pardo, T. (2012). Open government and e-government: democratic challenges from a public value perspective. *Information Polity*, 17(2), 83–97. doi:10.3233/IP-2012-0269.
- Hawley, J., and Hsu. Y. (2012). Demonstration on Ohio workforce data quality initiative. *Paper presented at the 25th Annual STATS-DC Data Conference*. Washington, D.C.
- Heinrich, C. (2012). How credible is the evidence, and does it matter? An analysis of the program assessment rating tool. *Public Administration Review*, 72(1), 123–134. doi:10.1111/j.1540-6210.2011.02490.x.
- Heinrich, C.J. (2007a). Evidence-based policy and performance management: Challenges and prospects in two parallel movements. *The American Review of Public Administration*, 37(3), 255–277. doi:10.1177/0275074007301957.
- Heinrich, C.J. (2007b). False or fitting recognition? The use of high performance bonuses in motivating organizational achievements. *Journal of Policy Analysis and Management*, 26(2), 281–304.
- Heinrich, C.J. (2008). Advancing public sector performance analysis. *Applied Stochastic*

- Models in Business and Industry*, 24(5), 373–389.
- Heinrich, C.J., Peter, R. and Troske, K. (2008). The role of temporary help employment in low-wage worker advancement. In D. Autor (eds.), *Studies of Labour Market Inter Mediation* (pp 399-436). Chicago: University of Chicago Press.
- Hess, C. and Ostrom, E. (2003). Ideas, artifacts, and facilities: Information as a common-pool resource. *Law and Contemporary Problems*, 66(1/2), 111–145. doi:10.2307/20059174.
- Hess, C. and Ostrom, E. (2007). *Understanding knowledge as commons: From theory to practice*. Cambridge, MA: MIT Press.
- Hsu, Y. (2011). Gainful employment regulation amendment in higher education act of 1965. *Final Report in Higher Education Policy*. Columbus, OH.
- Ikemoto, G.S. and Marsh, J. A. (2007). Cutting through the “data-driven” mantra: Different perceptions of data-driven decision making. In Moss, P. A. (eds.), *Evidence and Decision Making: 106th yearbook of the National Society for the Study of Education* (pp. 104–131). Malden, MA: Blackwell Publishing.
- ILO (2001). The impact of decentralization and privatization on municipal services. Retrieved from <https://www.ilo.org/public/english/standards/relm/gb/docs/gb283/pdf/jmmsr.pdf>, 15 April 2020.
- Jennings, E.T. and Hall, J.L. (2012). Evidence-based practice and the use of information in state agency decision making. *Journal of Public Administration Research and Theory*, 22(2), 245–266. doi:10.1093/jopart/mur040.
- Kelly, J.M. (2002). Why we should take performance measurement on faith (facts being hard to come by and not terribly important). *Public Performance & Management Review*, 25(4), 375–380. doi:10.2307/3381132.
- Kim, T., Johansen, M. and Zhu, L. (2019). The effects of managers’ purposeful performance information use on American hospital performance. *Public Performance & Management Review*, 43(1), 129–156. doi:10.1080/15309576.2019.1638275.
- Koning, P. and Heinrich, C. (2010). Cream-skimming, parking and other intended and unintended effects of performance-based contracting in social welfare services. (*Discussion Paper 46*). IZA. Retrieved from [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=1570399](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1570399), 3 March 2012.
- Kroll, A. (2015). Explaining the use of performance information by public managers: a planned-behavior approach. *The American Review of Public Administration*, 45(2), 201-215. doi:10.1177/0275074013486180
- Kranich, N. and Schement, J. R. (2008). Information commons. *Annual Review of Information Science and Technology*, 42(1), 546–591. doi:10.1002/aris.2008.1440420119.
- Kusek, J. Z., & Rist, R. C. (2004). *Ten steps to a results-based monitoring and evaluation system*. The World Bank: Washington, D.C.
- Lee, C. (2019). Understanding the diverse purposes of performance information use in nonprofits: An empirical study of factors influencing the use of performance measures. *Public Performance & Management Review*, 43(1), 81–108. doi.org/10.1080/15309576.2019.1596136
- Lee, J. and Johnston, E.W. (2013). How to embed transparency into collaborative governance. *PA Times Online*. Retrieved from <http://patimes.org/embed-transparency-collaborative-governance>, 5 October 2017.

- Lee, J. Y. & Wang, X. (2009). Assessing the impact of performance-based budgeting: a comparative analysis across the United States, Taiwan, and China. *Public Administration Review*, 69(Special Issue), 60–66.
- Lewin, T. (2013). Obama's plan aims to lower cost of college. *The New York Times*, Dated 22 August 2013.
- Lynch, C. (2008). Big data: How do your data grow? *Nature*, 455(7209), 28–29. doi:10.1038/455028a.
- Mandinach, E. B., Honey, M., & Light, D. (2006). A theoretical framework for data-driven decision making. *Paper presented at the annual meeting of American Educational Research Association*, San Francisco.
- Martin, M. (2013). MacArthur fellow crunches data to streamline health care. *NPR.org*. <http://www.npr.org/2013/09/26/226477356/macarthur-fellow-crunches-data-to-streamline-health-care>, 5 January 2018.
- McGinnis, M.D. (2011). Networks of adjacent action situations in polycentric governance. *Policy Studies Journal*, 39(1), 51–78. doi:10.1111/j.1541-0072.2010.00396.x.
- McGinnis, M.D., and Ostrom, E. (2012). Reflections on Vincent Ostrom, public administration, and polycentricity. *Public Administration Review*, 72(1), 15–25. doi:10.1111/j.1540-6210.2011.02488.x.
- Moynihan, D.P. (2008). *The dynamics of performance management: Constructing information and reform*. Washington DC: Georgetown University Press.
- Moynihan, D., Fernandez, S., Kim, S., LeRoux, K., Piotrowski, S., Wright, B., and Yang, K. (2011). Performance regimes amidst governance complexity. *Journal of Public Administration Research and Theory*, 21(s1), i141–155.
- Moynihan, D. and Pandey, S. (2010). The big question for performance management: Why do managers use performance information. *Journal of Public Administration Research and Theory*, 20(4), 849–866. doi:10.1093/jopart/muq004.
- Mueser, P.R., Troske, K.R. and Gorislavsky, A. (2007). Using state administrative data to measure program performance. *The Review of Economics and Statistics*, 89(4), 761–783. doi:10.1162/rest.89.4.761.
- Noveck, B.S. (2009). *Wiki Government: How technology can make government better, democracy stronger, and citizens more powerful*. Washington, DC: Brookings Institution Press.
- OECD. (2018). *OECD Draft policy framework on sound public governance*. <https://www.oecd.org/gov/draft-policy-framework-on-sound-public-governance.pdf>, 12 April 2020.
- OECD. (n. d.). *Enhancing research performance through evaluation, impact assessment and priority setting*. <https://www.oecd.org/sti/inno/Enhancing-Public-Research-Performance.pdf>, 10 April 2020.
- Ohio Education Research Center. (2012). *The Ohio State University*. Retrieved from <http://oerc.osu.edu/data/available-data>, 5 October 2018.
- Orszag, P.R. (2009). *Open Government Directive*. Washington, DC: Office of Management and Budget.
- Ostrom, E. (2007a). Institutional rational choice: An assessment of the Institutional Analysis and Development Framework. In *Theories of the Policy Process*, 2nd ed P.A. Sabatier (ed.). Cambridge, MA: Westview Press.

- Ostrom, E. (2007b). A diagnostic approach for going beyond panaceas. *The Proceedings of the National Academy of Sciences*, 104(39), 15181–15187. doi:10.1073/pnas.0702288104.
- Ostrom, E. (2011). Background on the institutional analysis and development framework. *Policy Studies Journal*, 39(1), 7–27. doi:10.1111/j.1541-0072.2010.00394.x.
- Pardo, T.A., Gil-Garcia, J.R. and Burke., G.B. (2008). Governance structures in cross-boundary information sharing: Lessons from state and local criminal justice initiatives. *In Hawaii International Conference on System Sciences. The Proceedings of the 41st Annual*, 211–211. doi:10.1109/HICSS.2008.185.
- Radin, B. (2006). *Challenging the performance movement: Accountability, complexity, and democratic values*. Washington, DC: Georgetown University Press.
- Sanchez, C. (2013). Do the data exist to make a college-rating system work? *NPR.org*. <http://www.npr.org/2013/08/22/214520122/does-the-data-exist-to-make-college-rating-system-work>, 7 May 2015.
- Stevens, D. (2012). *Documents and presentations enabled by or related to the administrative data research and evaluation (ADARE) project 1998-2012*. Washington, DC: U.S. Department of Labor, Employment and Training Administration. <http://www.jacob-france-institute.org/wp-content/uploads/ADARE-publications-presentations-compendium-11-8-12.pdf>, 1 October 2017.
- Sylvia, R. D. and Sylvia, K. M. (2004). *Program planning and evaluation for the public manager*. Chicago, Illinois: Waveland Press.
- Thorn, C.A. and Meyer, R.H. (2006). Longitudinal data systems to support data-informed decision making a tri-state partnership between Michigan, Minnesota, and Wisconsin. *WCER Working Paper No. 2006-1*. Madison, WI: University of Wisconsin–Madison, Wisconsin Center for Education Research.
- Walker, R. M., Lee, M. J., James, O. and Ho, S. M. Y (2018). Analyzing the complexity of performance information use: experiments with stakeholders to disaggregate dimensions of performance, data sources, and data types. *Public Administration Review*, 78(6), 852-863. doi:10.1111/puar.12920.
- Wang, R.Y and Strong, D.M. (1996). Beyond accuracy: What data quality means to data consumers. *Journal of Management Information System*, 12(4), 5–33.
- Wang, X.H. (2008) Convincing legislators with performance measures. *International Journal of Public Administration*, 31(6), 654–667. doi:10.1080/01900690701641232.
- Wang, X.H. and Berman, E. (2001). Hypotheses about performance measurement in counties: Findings from a survey. *Journal of Public Administration Research and Theory*, 11(3), 403–428.