EXAMINING THE COMPLEX DYNAMICS OF OPEN GOVERNMENT: TRENDS, DETERMINANTS, AND IMPACTS

by

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ABSTRACT OF THE DISSERTATION

Examining the complex dynamics of open government: Trends, determinants, and impacts

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Open government initiatives have been implemented at every level of government around the world in the last decade. These initiatives are fueled by a belief that open government will make governments more transparent, accountable, and collaborative. However, while open government initiatives continue to expand, basic questions remain regarding how this new wave of institutional reform actually impacts the quality of government. To address such ambiguity, this dissertation examines three interrelated research questions that are derived from the framework of the governance model and aim to address the different institutional, organizational, and individual effects of this reform: (1) At the institutional level, how do we conceptualize open government as a means of addressing social problems (e.g., lacking transparency or effectiveness)? (2) At the organizational level, what factors influence an organization’s efforts to implement open government initiatives? (3) At the individual level, can open government initiatives really empower individual users in ways that increase their confidence to participate in public affairs? This dissertation evaluates these questions in three essays which draw on distinct research methods and theoretical lenses, including contingency theory, diffusion of innovation theory, and social cognitive theory. Following the related requirements of Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA), Study
1 consists of a systematic literature review to examine open government research trends and the conceptualization of open government at different levels of government. Study 2, focusing on open government implementation in the context of New Jersey school districts, uses a qualitative comparative analysis (QCA) to identify combinations of determinants that are consistently associated with school district website openness. Study 3 investigates the causal relationship between the core policy tool of open government initiatives—open government data—and individuals’ perceived self-efficacy to examine whether open government initiatives can really strengthen the perception of empowerment. This study includes two online survey experiments, respectively comprising 840 and 960 American adults.
To My Beloved Parents, Sheng-Chuan Tai & Yu-Ling Wang

And

To My Dear Wife, Chen-Fang Hsiao

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Chapter 1. Introduction

At present, almost every country in the world is dealing with an unprecedented health emergency, the spread of COVID-19. This pandemic has not only threatened lives and healthcare systems, but has also challenged the way public organizations operate. During the pandemic, extensive critiques have been raised on a series of issues regarding public organizations, such as opaque decision-making processes, the inefficient allocation of scarce resources, poor leadership, and insufficient public-private collaboration. To deal with these issues, one of the commonly mentioned potential solutions is increasing government’s transparency and openness (Alwan et al., 2020; Kirkpatrick et al., 2020; Schwartz, 2020; Spalluto et al., 2020). On the one hand, the proposition of increasing openness echoes the specific administrative reform in the Obama administration, the open government movement. On the other hand, promoting government openness mainly aims to facilitate communication with citizens and build people’s trust in the government, through tools such as data dashboards and press briefings on COVID-19 updates. The related implementations of open government have been considered as a “substratum” to contain this pandemic due to its effectiveness and efficiency not only to disseminate scientific knowledge or policy guidance, but also to facilitate novel solutions via public participation or public-private collaboration (Hagen et al., 2021; Lovari, D'Ambrosi & Bowen, 2020; Yiannakoulias et al., 2020).

The above discussions lay the foundation for this dissertation, which focuses on the movement of open government and seeks to expand our understanding of openness through a holistic approach. Open government is an evolving concept that attempts to promote a variety of democratic values, such as accountability, responsiveness, and freedom of
information (Ganapati & Reddick, 2014; Harrison et al., 2012; Lourenço, 2015; Perritt Jr, 1997). In this respect, open government initiatives represent an effort to synthesize multiple aspects from past institutional reforms into one coherent movement (Coglianese, 2009; McDermott, 2010; Ingrams, Piotrowski & Berliner, 2020). However, as open government initiatives continue to expand and even become a lexicon of governmental activities, both practitioners and researchers have had to address three groups of interrelated and fundamental issues regarding conceptualization, implementation, and impact. In academia, researchers have repeatedly indicated concern about the conceptual ambiguity over what open government is (Wirtz & Birkmeyer, 2015; Yu & Robinson, 2012), which further impedes the theorization of open government regarding why public organizations determine to implement it and how open government affects the quality of government.

Practically, it has also been found that the formats of implementing open government are inconsistent (Yu & Robinson, 2012) and the effects of open government are conflicting (de Kool and Bekkers, 2015). These concerns not only reflect the lack of a careful conceptualization process for clear guidance (Kornberger et al., 2017), but also indicate an insufficient understanding of the dynamics among open government’s conceptualization, implementation, and impacts. More precisely, a research framework to holistically examine these three interrelated issues and to capture multidimensional features of open government has been missing in the literature. The absence of holistic examination could further generate fragmented research findings (Grimmelikhuijsen & Feeney, 2016) and impede the long-term development and research of open government.

To tackle these research gaps, this dissertation employs the governance model framework to conceive the research questions and research design. The first feature of this
The framework is its clear clarification of different levels of analysis. The macro-level analysis mainly focuses on the overall design or strategies of open government initiatives, while the meso-level analysis concentrates on organizations’ consolidation and implementation, and the micro-level analysis covers individual citizens’ and bureaucrats’ behaviors and attitudes (Klijn et al., 2013; Michels & Meijer, 2008; Raadschelders, 2011; Roberts, 2020). More importantly, the second feature of this framework is a clear indication of the dynamics among the three levels of analysis: The overall design at the macro level could impact the implementation and individuals at lower levels, and the organizational impacts of the meso- and micro-level implementations on individuals could also reframe the conceptualization of the macro design reciprocally (Roberts, 2020). This holistic interpretation assists researchers to bridge the preceding unsolved issues of open government, facilitates theory building, and prevents fragmented research findings. Based on the framework of the governance model, the main research questions of this dissertation have been formulated as follows: (1) How is the governance model of open government conceptualized to cope with the identified social problems at the macro level? (2) What are the determinants to explain the variations of implementation at the meso level of the governing model of open government? (3) Can open government initiatives really empower individual users who are involved at the micro level of a collaborative governing structure of open government? Guided by these questions, this study aims to holistically examine the influence of open government on the current democratic system from macro, meso, and micro perspectives.

To address these research questions, this dissertation employs a systematic literature review and two empirical studies. Study 1 examines the questions regarding the
conceptualization of open government, including how the governance model of open government is conceptualized and what outcomes have been attributed to the model. Considering that the macro issue of conceptualization can be better tackled through a comprehensive literature review, Study 1 fulfills the requirements of the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) to conduct a systematic literature review of 189 articles from the field of public administration and political science. After identifying school districts as an important meso organization to fulfill open government initiatives, Study 2 focuses on the context of New Jersey’s school districts and employs the techniques of qualitative comparative analysis (QCA) to examine the determinants of each school district’s (n = 41) website openness. The analysis model of Study 2 consists of both supply- and demand-based factors, such as superintendents’ managerial orientation and the racial diversity of the school districts. To prevent inaccurate research findings caused by failing to differentiate between diverse open government policy tools, Study 3 strategically focuses on one primary policy tool of open government initiatives, namely open government data. As a micro-level analysis, this study investigates the causal relationship between open government data and individuals’ perceived self-efficacy by conducting two online survey experiments, respectively comprising 840 and 960 American adults.

The research findings of these three studies contribute to a more comprehensive understanding of how the open government movement relates to the new collaborative governing structure and the quality of government. Study 1 indicates that open government is generally conceptualized as a new governing structure, emphasizing both transparency (vision) and public participation (voice), which is against the argument of conceptual
ambiguity. However, this study also reveals a “transparency-driven focus” for both the case selection of academic studies and practical implementation. This unbalanced focus of open government clearly marks the gap between its conceptualization and its implementation. Study 2 indicates that the implementation of open government is not determined by a single factor but by the multiple, equally effective configurations of factors leading to greater accessibility, transparency, and participation. More specifically, while each dimension of open government is determined by different configurations of factors, the supply-based factors, such as organizational capacity and administrative professionalism, are consistently effective across multiple configurations. By contrast, the effects of demand-based factors are limited with regard to the aspect of accessibility. Based on the finding of transparency-centered implementation in the first study, Study 3 is designed to further examine the potential impacts of this transparency-centered implementation, with a specific focus on the causal relationship between open government data and self-efficacy. However, two rounds of survey experiments consistently indicate that access to open government data leads to decreased confidence in public participation. The negative effects of open government data found at the micro level not only go against the hypothesis derived from social cognitive theory but also trigger the discussion of conceptualization for open government at the macro level. In addition, relying on expanding transparency to promote public participation might not work as expected.

The next chapter of this dissertation first introduces the concept of the governance model and how this model is used to frame three research questions regarding conceptualization, implementation, and impact. This is followed by the systematic literature review and two empirical studies. The dissertation concludes with a
comprehensive discussion of the different research findings and suggestions for a future research agenda.
Chapter 2. Theoretical basis and research Questions

The purpose of this chapter is to address the theoretical foundation of this dissertation. This chapter contends that open government initiatives represent a new governing structure at the macro level; this structure not only steers the interrelationships among government, the private sector, and civil society but also influences the operations of public organizations at the meso level and the behaviors of individual citizens at the micro level. Using the governance model framework to study open government is consequently important, because it provides an opportunity to holistically review the impacts of open government initiatives on the current democratic systems by clarifying the dynamic relationships that exist among the macro, meso, and micro levels. This chapter starts by defining the concept of a governance model and the research framework for macro-, meso-, and micro-level analysis. The second section discusses contemporary governance models – including Weberian bureaucracy, New Public Management (NPM), and Open Government – and specifies how open government has grown out of the deficiencies of the two other models. Based on the description of these two models, the significance of framing open government as a governance model is further explained.

1. The concept of the governance model and the three levels of analysis

1.1 Definition

The concept of “governance” is defined in a variety of ways (Kelly, 2005; Meuleman, 2008; Rhodes, 1996; Shout & Jordan, 2005). This dissertation follows Meuleman (2008), who defined governance in broad terms, interpreting it as a governing system that reflects relations among actors from public, private, and civil society to address public issues (see also Börzel, 1998; Considine & Lewis, 2003; Davies, 2002; Keast,
Mandell & Brown, 2006; Powell, 1990; Tenbensel, 2005). More specifically, governance can be understood as “the totality of interactions, in which government, other public bodies, the private sector and civil society participate, to solve societal problems or creating societal opportunities” (Meuleman, 2008: 11). This interpretation or definition first differentiates between governance and the traditional perception of government, which mainly entails a series of public institutions that distribute social values through an authoritative order (Hysing, 2009; Kettl, 2015b), by treating government as one type of actor interacting with other participants within the governing system. More importantly, because the emphasis is placed on the totality of interactions, this definition also implicitly links the three levels of analysis – the macro, meso, and micro levels – to emphasize that actors from different sectors and levels jointly form the specific governing structure.

1.2 Extrinsic analysis: Typology and dynamics

While the concept of governance centers on the interactions among diverse actors from different sectors and at various levels, researchers have used different criteria to propose framework-of-governance models. One of the most widely adopted frameworks is based on the extent of coupling among actors to differentiate between various types of governance models (Börzel, 1998; Considine & Lewis, 1999; Davies, 2002; Demil & Lecocq, 2006; Keast, Mandell & Brown, 2006; Meuleman, 2008; Powell, 1991; Thompson, 2003; Torfing & Triantafillou, 2013). For example, the model of hierarchy emphasizes the tight coupling status formed by dependent actors who follow strict orders from a centralized hierarchical structure. However, it should be noted that the primary purpose of differentiating governance models is to better understand the dynamics among various models, but not to contend the superiority of a specific model.
Assuming the uniqueness of each model, the framework-of-governance model is derived from the theory of transaction cost economics (TCE), which contends that each governance model has its own specific functioning cost¹ (Demil & Lecocq, 2006; Jones, Hesterly & Borgatti, 1997; Larson, 1992) and should be considered as a “discrete structural alternative” (Powell, 1990). Therefore, the new emerging governance model, which is conceived to cope with the new social context, cannot automatically “replace” the former model, but instead provides an alternative means to address public issues (Demil & Lecocq, 2006; Jones, Hesterly & Borgatti, 1997; Meuleman, 2008). In addition, while multiple governance models exist simultaneously, one needs to beware of potential tensions between governance models, since different models may be operated with distinctive organizational designs or ideological assumptions (Considine & Lewis, 2003; Rhodes, 2000). To prevent potential conflicts, the academic community has requested further examination not only of the typology of governance models but also of the fundamental features of each model, including its scope, determinants, and impacts (Davies, 2002; Meuleman, 2008; Tenbensel, 2005; Torfing & Triantafillou, 2013).

1.3 **Intrinsic analysis: Three levels of a governance model (macro, meso, and micro)**

In addition to extrinsically comparing different types of governance models, the framework of governance further divides the analysis units into three levels to better specify the complexity of each governance model intrinsically (Howlett, 2009; Klijn et al., 2013; Michels & Meijer, 2008; Rhodes, 1988). The multi-level analysis is critical for the

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¹ According to TCE, transaction costs, which are generally produced by individuals’ uncertainty and their bounded rationality, associated with the subsequent negotiating and monitoring costs for the transactions among actors, will need to be carefully addressed through the unique mechanisms of each governance model (Demil & Lecocq, 2006). The economic performance or the coordination of policy-making can be enhanced, while the transaction costs are properly addressed with the corresponding governance model (Demil & Lecocq, 2006; Silverman, Nickerson & Freeman, 1997).
framework-of-governance model (Howlett, 2009; Kooiman, 1999). While the governing structure is formed by the interactions of diverse actors from different sectors or levels of government, appropriately covering three layers could be the pivot to: a) establishing a health research field, and b) providing a comprehensive observation that addresses potential variations and explains the real complexity (Howlett, 2009; Jilke, Meuleman & Van de Walle, 2015; Roberts, 2020). More importantly, the interactions at each level could be “viewed as co-determining each other in a form of embedded or nested relationship” (Howlett, 2009: 74). In other words, the interactions at lower levels are influenced by the actors on higher levels; the general governing structure at higher levels is formed by continuing interactions at the lower levels.²

In general, different levels of analysis can be divided into three groups: (1) The micro level mainly focuses on individuals, (2) the meso level addresses organizations, and (3) the macro level centers on the grand society or social systems (Klijn et al., 2013; Michels & Meijer, 2008; Raadschelders, 2011; Roberts, 2020). Focusing on the context of open government, this dissertation follows Roberts’ definitions (as listed as Table 1) of the three layers, defining the macro-level analysis of open government as the study of the general strategies or the design of the overall governance structure constituted by open government initiatives to cope with the identified social issues or limitations of prior governance models. The focus of a macro-level analysis is mainly on how the strategies...

² For example, the initiative blueprint provided at the macro level not only specifies the general relations of the whole society but also constrains the behaviors of the meso- and micro-level actors (Roberts, 2020). From the perspective of the meso-level actors, in organizations that are usually implementing certain policy initiatives, a series of decisions are made to determine how those policy initiatives should be implemented in alignment with the organization's context and the perceived needs of individuals at the micro level. A reciprocal effect could eventually be formed from the micro- and meso-level to the macro-level actors, while learning or contestation procedures are conducted at the lower levels to examine whether certain initiatives actually attain the proposed objectives (Roberts, 2020).
are conceptualized to form the governance structure and to influence lower-level actors’ behaviors.

The analysis at the meso level, by contrast, centers on organizations implementing open government initiatives, such as local governments or school districts, with a special emphasis on how initiatives are installed based on an organization’s context. The meso-level analysis is important due to the possibilities to examine how the governing structure is constructed during its implementation and how the contextual factors are related to the implementation.

Finally, the micro-level analysis can be described as the study of psychological attitudes or behaviors of individuals involved in or influenced by a governing structure. The significance of this analysis is to provide “micro foundations” by linking individuals with macro- or meso-level characteristics (Jilke, Meuleman & Van de Walle, 2015), which is crucial to validate the proposed objectives of open government (e.g., for open government to facilitate public trust; Wirtz & Birkmeyer, 2015) and to monitor the potential reciprocal effects.

**Table 1. Level of analysis of open government as a governance model**

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Macro</td>
<td>Study of the general strategies or the design of the overall governance structure regarding open government initiatives devised by top political leaders at the federal level in order to cope with the identified social issues</td>
</tr>
<tr>
<td>Meso</td>
<td>Study of the consolidation, administration, or implementation of open government initiatives for specific institutions in state or local governments</td>
</tr>
<tr>
<td>Micro</td>
<td>Study of the psychological attitudes, perceptions, or behaviors of individuals (citizens or public employees) who are involved in or influenced by the collaborative governing structure of open government</td>
</tr>
</tbody>
</table>

Source: Modified from Roberts (2020)
2. Contemporary governance models: Weberian bureaucracy, NPM, and Open Government

This section introduces three contemporary governance models and especially emphasizes how the model of open government was established to cope with the limitations of the other two models. The emergence of a new governance model is generally derived from launching a series of management reforms or innovative initiatives that reshape the governing relationship between government and civil society (Siddiquee, 2006). These three governance models—Weberian bureaucracy, NPM, and open government—emerged from their specific socio-political contexts and formed distinctive governing relationships between government and civil society. Today, these three governance models can still be found, and no one model has really replaced the other preceding models. Based on the earlier introduction to the research on the framework-of-governance model, the comparison of three governance models can demonstrate not only the uniqueness of each model but also the dynamics of each model to prevent potential tensions. The section follows the framework of the preceding intrinsic analysis to compare the three governance models based on the overall design and strategies at the macro level, the applied techniques of organizations at the meso level, and the expected role of individual citizens at the micro level.
Table 2. Comparative governance models at three levels

<table>
<thead>
<tr>
<th></th>
<th>Weberian Bureaucracy</th>
<th>NPM</th>
<th>Open Government</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Background</strong></td>
<td>Transition from agricultural society and authoritarian political system</td>
<td>Collapse of welfare state; critiques of big government; international financial crisis</td>
<td>Respond to secretive conduct of government, criticisms of lack of participation channels, and low effectiveness</td>
</tr>
<tr>
<td><strong>Macro: Overall design</strong></td>
<td>A centralized hierarchical governing structure emphasizing the principles of rule by law and efficiency</td>
<td>A market-centered governing structure supported by the principles of efficiency maximization and cost-effectiveness</td>
<td>A collaborative governing structure emphasizing the strategies of transparency, participation, and collaboration</td>
</tr>
<tr>
<td>and strategies</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Meso: Organizations’ techniques and practices</strong></td>
<td>Managerialism-oriented approaches: professional and dehumanized bureaucrats; hierarchical mode of decision-making process; fixed rules</td>
<td>Managerialism-oriented approaches: contracting out; disclosure of performance information; market competition</td>
<td>Advanced ICTs, technology-assisted transparency; citizen sourcing; e-participation; cross-sector collaboration</td>
</tr>
<tr>
<td><strong>Micro: Role of citizens</strong></td>
<td>The ruled; the client; the voter who relies on formal political mechanisms (e.g., voting) to participate</td>
<td>Customer; rational decision-maker</td>
<td>Active participants; partners</td>
</tr>
<tr>
<td><strong>Micro: Role of bureaucrats</strong></td>
<td>Ruler</td>
<td>Manager; one of many competitors or service providers</td>
<td>Service providers and coordinators</td>
</tr>
</tbody>
</table>

### 2.1 Weberian bureaucracy

The governance model of traditional Weberian bureaucracy is one of the dominant approaches in the classic period of public administration development. The background of this model can be traced back to the socio-political context of the beginning of the 20th century. Politically, traditional arbitrary authoritarianism and nepotism in Europe encountered tremendous pressure to reform (Herbst, 1976). Socially, managerial techniques were evolving, while the economic system was changing from a traditional
agriculture-centered industry to a modern industry after the Industrial Revolution. Accordingly, Max Weber (1922) believed that organizations should be managed based on the rules of scientific management, similar to those embodied by the Prussian military (Considine & Lewis, 1999; Frederickson, 1980; Meuleman, 2008).

At the macro level, the general design of this governance aims to establish a hierarchical governing structure featuring a centralized decision-making process and chain of command to pursue greater efficiency and a rule-by-law system to clearly direct the behavior of each actor. At the meso level, public organizations are considered to be the primary actors to implement public policies. Moreover, following the general design of the centralized hierarchy, multiple managerial techniques are applied, including: (1) providing fixed rules and laws to control subordinate bureaucrats, (2) treating individual bureaucrats as dehumanized cogs of the organization, and (3) dividing work into small pieces and clearly assigning them to individual bureaucrats (Frederickson, 1980; Rosenbloom, 1983; Weber, 1922). At the micro level, on the one hand, since the decision-making process is highly centralized, individual citizens are passively directed and have limited channels to participate in public affairs; on the other hand, individual bureaucrats can be considered to be authorized rulers leading the governing structure.

Although the governance model of Weberian bureaucracy was prevalent at the beginning of the 20th century, aligning with the trend of scientific management, this model has encountered several criticisms. First, it has been criticized because of bureaucrats’ tendency to ignore government transparency: Within the structure of centralized hierarchy, secrecy is perceived as an essential and inherent characteristic to maintain the competitiveness and superiority of professional bureaucracy (Rourke, 1957). Second, the
other main criticism is ignoring democratic values—participation and accountability—while failing to allow any type of public participation (De Blasio & Selva, 2016; Kornberger et al., 2017) and making bureaucrats accountable by simply relying on fixed rules. Finally, the government monopoly of public services has been considered to be insufficient to address complex challenges across sectoral and governmental boundaries (Kettl, 2015a; O’Leary, 2015).

2.2 New public management

While also pursuing greater efficiency, the governance model of NPM, by contrast, reconsiders what government should do and strongly proposes market-based mechanisms drawn from neoliberalism and public choice theory (Kettl, 2015a). The origin of NPM can be attributed to the collapse of the welfare state and the emergence of new institutional economics at the end of the 1970s: these developments forced governments to abandon the traditional big-government governing structure (Hood, 1991). To prevent the poor efficiency and effectiveness as well as the ignorance of democratic values caused by the hierarchical governing structure, a new governance model, namely NPM, was established to address the aforementioned criticisms and the new socio-political context.

At the macro level, the governance model of NPM does not solely aim to reform the Weberian bureaucratic system with market mechanisms, but even reshaped the structural delivery of public services. New public management redefined government's role as a public service provider competing with its private counterparts, which further involved actors from the private sector and largely decreased government’s burden by focusing on those core duties to “make, enforce, and administer governmental decisions” (Kettl, 2015a; Reddel, 2002).
At the meso level, multiple managerial-centric approaches are applied to form a business-like environment, including conducting cost-effectiveness analyses, employing incentive systems, and releasing performance information to enhance organizational efficiency (Hood, 1991). At the micro level, on the one hand, individual citizens are perceived as rational and independent customers who choose their preferred public service providers according to the released performance information; on the other hand, individual bureaucrats are considered to be the employees or managers of private organizations that are pursuing greater efficiency and competing with other public service providers.

Even though the NPM governance model was established to cope with the limitations of Weberian bureaucracy and the contemporary social context, the market-oriented governing structure has still encountered multiple criticisms for similar issues. First, while the NPM model, to some extent, decreases secrecy by disseminating government’s performance information in order to improve efficiency or public trust (Grimmelikhuijsen & Meijer, 2014; Grimmelikhuijsen et al., 2013), this type of disclosure is only partially transparent and does not allow for a comprehensive disclosure of information relating to decision-making processes. Second, the NPM model has also been criticized for neglecting democratic values. Since individual citizens are treated as customers who can obtain the best services among different competing providers, the space for public participation and deliberation is limited and insignificant. In addition, the concern regarding low accountability could be more apparent for NPM, since the emphases of the governance model are on creating incentive-based managerialism and pursuing efficiency through market mechanisms (Gualmini, 2008; Riccucci, 2001; Rohr, 1998). Third, the NPM model has been met with suspicion regarding the limitations of market
mechanisms for pursuing public values (O’Flynn, 2007) and for improving effectiveness (Andrews & Van de Walle, 2013), especially when confronting the issue of market failure.

2.3 Open government

In 2008, the newly elected Obama administration encountered both new normative dilemmas and criticisms inherited from prior governance models. The normative dilemmas pertained to the secretive conduct of government after the 9/11 terrorist attack and the war in Afghanistan (Ganapati & Reddick, 2012), which triggered tremendous normative pressure for government transparency. The criticisms related to the hierarchical and market-based governing structures. Furthermore, with regard to the issue of secrecy, the disclosure mechanisms of NPM were limited to performance-related information, but failed to cope with citizens’ requests for expanded transparency. With respect to democratic values, both Weberian bureaucracy and NPM neglected the necessity of public participation (Gualmini, 2008; Rouillard, 1999), while the two models treated individual citizens as clients and rational customers, respectively (Bryson, Crosby & Bloomberg, 2014). Moreover, the two governance models were criticized for low effectiveness because of the monopoly of public service delivery in a Weberian bureaucracy and the potential market failures of NPM (Andrews & Van de Walle, 2013; Kettl, 2015a; O’Leary, 2015). As a result, the changing social context demanded a new governing structure other than that based on hierarchy and the market.

The new governance model of open government hence featured a collaborative governing structure (Ansell & Gash, 2008), different from the hierarchy and market orientations of the Weberian state and NPM governance models. At the macro level, open government reshaped the relationship between government and civil society by inviting
diverse actors to participate in decision-making processes and to collaborate in providing public services in a transparent environment. Within this collaborative governing structure, three macro strategies exist. The first one involves promoting transparency, which addresses the secrecy issue in Weberian bureaucracy and expands the scale and diversity of information dissemination in NPM to make governments accountable or to enhance their efficiency in data-driven decision-making (Veljković, Bogdanović-Dinić & Stoimenov, 2014; Zeleti, Ojo & Curry, 2016). The second macro strategy promotes public participation, in which general citizens are the primary actors. This strategy not only reflects the intention to diversify the related mediums for stakeholders to be involved in the decision-making processes (Grimmelikhuijsen & Feeney, 2016; Wijnhoven, Ehrenhard & Kuhn, 2015), but also recognizes the importance of democratic values. The third macro strategy entails facilitating collaboration with actors from the private sector to pursue novel solutions to long-standing problems and improve government’s effectiveness. In contrast to the perspective of participation that values collective expertise, the strategy of collaboration emphasizes conceiving innovative solutions rather than expanding participation (Lathrop & Ruma, 2010; Wirtz & Birkmeyer, 2015). More importantly, the strategy of collaboration centers on the involvement of nonprofits, the private sector, and companies equipped with essential capacity to develop new strategies or services through consistent collaborations with government (Lathrop & Ruma, 2010; Wirtz & Birkmeyer, 2015) instead of relying on privatization or contracting out.

The macro strategies of this collaborative governing structure, which is generally based on the U.S context, and the primary actors are summarized in Figure 1. Within this governance model, the macro strategy of transparency not only represents the fundamental
value of democratic society, but also facilitates participation and collaboration (Attard et al., 2015). While participation and collaboration respectively seek to involve more general participants and conceive new solutions by engaging professional parties, they share a basic value: the wisdom of crowds. In addition, while the general public can better participate in public affairs or collaborate with government, the extent of transparency would eventually be reinforced because of the greater accessibility of information.

Figure 1. The governance model of open government at the macro level

At the meso level, public organizations are expected to promote open government initiatives, and multiple technology-mediated techniques have been adopted to realize the three macro strategies (Kornberger et al., 2017). To promote government transparency, for example, one of the most popular practices involves open government data, which relies on websites and the internet to disclose government-related information in a machine-readable format to trigger further applications by the public (Attard et al., 2015; Janssen, 2012). Other policy tools to promote public participation and collaboration include: (1) social media or other e-participation channels (e.g., online petitions), and (2) the related practices of citizen-sourcing/crowdsourcing or a civic hackathon. At the micro level, on the one hand, individual citizens are treated as meaningful participants in public affairs,
able to actively monitor government’s performance according to the released data and to express policy preferences through e-participation mediums. On the other hand, the role of an individual bureaucrat is no longer as the ruler of a hierarchy or the rule keeper of market mechanisms, but as the coordinator facilitating public participation and collaboration to enhance government’s effectiveness and responsiveness.

3. The significance of treating open government as a governance model

The concepts of Weberian bureaucracy, NPM, and open government have flourished in the field of public administration. For different reasons, these three institutional reforms might be conceptualized distinctively. For example, some studies may conceptualize the concepts from the perspective of paradigm evolution to empirically describe the transitions of primary practices or core values embedded in each reform (e.g., Gow & Dufour, 2000; O’Leary, 2015; Harrison et al., 2012). More specifically, the initiative of open government has been viewed as an innovation of technologies (McNutt et al., 2016; Yu & Robinson, 2012), with an emphasis on its convenience to provide novel public services and to spur economic growth (Zeleti, Ojo & Curry, 2016). However, previous studies may have paid less attention to the fact that open government has constructed a new collaborative governing structure and been implemented widely. That is, treating it as a paradigm shift on a large scale or a new technology at an organizational level may result in a lost opportunity to holistically discuss how macro-level strategies are related to meso-level implementations and individuals’ behaviors at the micro level. This dissertation argues that the framework-of-governance model is in compliance with the research purpose and can both prevent potential collision with other models and provide holistic insights.
The first important consideration when treating open government as a governance model is its potential contribution to shedding light on how open government differs from other governance models and how possible conflicts with other models can be prevented. When conceptualizing Weberian bureaucracy, NPM, and open government as paradigms or waves of reform, there might be a hidden argument that the latter might replace or terminate the dominance of the former. However, the reality could be the opposite. Although Weberian bureaucracy and NPM were prevalent much earlier than open government, those two types of practices are still the main components of contemporary public administration (Alonso, Clifton & Díaz-Fuentes, 2015; De Vries, 2010; Drechsler, 2005; Hyndman & Lapsley, 2016; Meuleman, 2008) and coexist with open government. As a result, one of the central questions would be how the relatively new practices (determinants and impacts) cope with other types of practices that are still in use. The framework-of-governance model is believed to contribute to this discussion. This framework not only acknowledges the uniqueness of each governance model, but also proposes clear identification of the features of each model (such as determinants or impacts) to prevent potential conflicts and to promote potential combinations (Meuleman, 2008).

More importantly, the framework-of-governance model is expected to provide holistic insights with its three analysis levels – macro, meso, and micro. The issue of open government could be highly complex (Lee & Kwak, 2012), and current approaches to studying open government generate fragmented findings (Grimmelikhuijsen & Feeney, 2016). On the one hand, each of the three macro strategies mentioned above requires a different corresponding implementation approach and furthermore generates distinctive
impacts on individuals. On the other hand, while the movement of open government has diffused to almost all levels of government (Ganapati & Reddick, 2012; McDermott, 2010; Wirtz & Birmeyer, 2015), diverse practices and actors also contribute to the complexity of open government. The framework-of-governance model is believed to prevent the situation of not seeing the forest for the trees. First, it assists researchers in indicating the research target through the three clearly defined levels of analysis, which address overall design and strategies, organizations’ consolidation and implementation, and individuals’ attitudes and behaviors, respectively. Second, this framework furthermore specifies the dynamics among these three levels of analysis—the constraints drawn from upper levels and the reciprocal effects caused by the lower levels—thereby enabling one to bridge the findings of each level and conduct a holistic examination.

4. Research Questions and significance

After introducing the research framework, this section aims to present the primary research questions and research significance. More specifically, in order to holistically examine the impact of open government on the contemporary democratic system, this section strategically applies three levels of analysis to address the current research gaps in open government studies at the macro, meso, and micro levels. The research gap at the macro level centers on the issue of conceptualization, wherein the general design of the open government model is vaguely specified and could further constrain the behaviors or attitudes of actors at lower levels (Kornberger et al., 2017; Wirtz & Birmeyer 2015; Yu & Robinson 2012). The research gap at the meso level focuses on the lack of appropriate discussion regarding the determinants of implementation for public organizations (Altayar, 2018; Armstrong, 2011; Bearfield & Bowman, 2016; Grimmelikhuijsen & Feeney, 2016).
That is, while the overall design of open government aims to establish a collaborative governing structure, the factors that can lead to implementation have not been well examined. Finally, the research gap at the micro level highlights the fact that prior empirical studies have seldom examined how open government impacts individuals’ attitudes and behavior. As three macro strategies and a variety of meso implementations aim to entitle individual citizens to be involved in the collaborative structure, there is no clear answer to the question of whether certain strategies or implementations can really alter individuals’ behaviors regarding participation in public affairs. Therefore, the research questions in this dissertation are drawn from these interrelated research gaps at three levels of analysis, and their research significance is specified below.

4.1 Current research gaps relating to open government

4.1.1 Macro level: How is open government conceptualized?

The study of open government at the macro level mainly centers on the overall design and strategies of open government initiatives. However, the rhetoric of open government has been considered ambiguous in terms of lacking a clear understanding of how it relates to public organizations, particularly those from different levels of government (Chatwin & Arku, 2017; Kornberger et al., 2017; McGee & Edwards, 2016; Yu & Robinson, 2012; Wirtz & Birkmeyer, 2015). The reason for the ambiguity is twofold. First, approaches to studying open government initiatives are mainly practice-driven (e.g., the Open Government Directive in 2009) and seldom focus on establishing theoretical foundations (Sandoval-Almazan & Gil-Garcia, 2016). Second, the characteristic of simultaneously involving multiple goals and concepts in one policy initiative has made open government a multidimensional rhetoric and contributed to ambiguity in terms of

To better examine the conceptualization of open government, a careful and holistic literature review that accounts for both academic definitions and real-world practices is essential (Sandoval-Almazan & Gil-Garcia, 2016). However, published literature reviews are limited, and they have neglected the necessity of holistically reviewing available studies. A preliminary search of online databases regarding public administration and political science revealed that eight literature reviews regarding open government were published between 2008 and 2019, five of which focused on the issue of open data (Attard et al., 2015; Lourenço, Piotrowski, & Ingrams, 2017; Ruijer & Martinius, 2017; Safarov, Meijer, & Grimmelikhuijsen, 2017) and one type of open government initiative implementation. The other three articles addressed the issue of social media (Alryalat et al., 2017), the relation between open government and democratic theories (Hansson, Belkacem, & Ekenberg, 2015), and the framework of the open government concept (Wirtz & Birkmeyer, 2015). Failing to comprehensively conceptualize open government could not only lead to ineffective action practice but also impede academic research. In summary, existing literature reviews have principally tackled the topic of open data rather than treating open government as a multidimensional concept, potentially resulting in further fragmented views (Grimmelikhuijsen & Feeney, 2016).

4.1.2 Meso level: What factors can facilitate the development of open government initiatives?

While public organizations at different levels of government are considered to be the primary actors in promoting open government initiatives, the central emphasis of
studies at the meso level is on how or why these organizations consolidate, administer, or implement open government initiatives. However, prior studies have not appropriately examined the determinants of implementation from both supply- and demand-oriented perspectives (de Kool, D & Bekkers, 2015; Yang & Wu, 2016).

Table 3. The literature regarding supply-oriented analysis

<table>
<thead>
<tr>
<th>Framework</th>
<th>Analysis aspect</th>
<th>Determinants</th>
<th>Operationalization</th>
<th>Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply-oriented analysis</td>
<td>Organizational capability</td>
<td>Resources</td>
<td>Population</td>
<td>McNutt et al., 2016; Grimmelikhuijsen and Feeney, 2016</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Perceived ICT ability or infrastructure</td>
<td>Grimmelikhuijsen and Feeney, 2016; Wang &amp; Lo, 2016</td>
</tr>
<tr>
<td></td>
<td>Organizational structure</td>
<td>Political structure</td>
<td>Mayor-council system</td>
<td>Grimmelikhuijsen and Feeney, 2016</td>
</tr>
<tr>
<td></td>
<td>Organizational environment</td>
<td>Organizational climate</td>
<td>Perceived routineness</td>
<td>Grimmelikhuijsen and Feeney, 2016</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Normative or coercive pressure</td>
<td>Perceived pressures from peers and upper agencies</td>
<td>Wang and Lo, 2016</td>
</tr>
<tr>
<td></td>
<td>Innovation feature</td>
<td>Compatibility</td>
<td>Commitment to experience with public participation</td>
<td>McNutt et al., 2016; Grimmelikhuijsen and Feeney, 2016</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Observability</td>
<td>Perceived benefits</td>
<td>Wang and Lo, 2016</td>
</tr>
</tbody>
</table>

Source: Author

Past empirical studies (listed in Table 3) discussing the determinants of open government implementation have viewed open government initiatives as a type of innovation that can be analyzed by the theoretical framework of diffusion of innovation (DOI) (e.g., Grimmelikhuijsen & Feeney, 2016). Since the DOI framework focuses on individual organizations, prior empirical studies have tended to center on supply-oriented determinants at the organizational level and have identified factors pertaining to an
organization’s capability, such as resources (McNutt et al., 2016) or political structure (Grimmelikhuijsen & Feeney, 2016).

Although the DOI framework has been well studied in the field, the literature listed in Table 2 may have critical limitations. First, solely studying supply-based determinants can only reveal partial truths; this approach neglects the types of needs that government has perceived and the factors that can motivate it to implement open government initiatives. Second, the research findings of supply-based studies could be incomplete in that they ignore the impacts of individual managers. Certain issues could be more serious in smaller public organizations with fewer members (e.g., a school district).

4.1.3 Micro level: What are the potential impacts on individuals?

Studies of open government at the micro level aim to examine whether open government initiatives can really impact individual citizens’ or bureaucrats’ psychological attitudes or behaviors, as macro strategies propose. However, several research limitations have been observed in prior empirical studies at the micro level, including concerns about the research scale, theoretical framework, research method, and mixed findings. According to the preliminary literature review, findings of prior research on impact analysis have remained limited (only eight studies were collected from the last decade), indicating potential for further research. Second, while the examined impacts cover government-, citizen-, and society-related perspectives, a clear theoretical framework that articulates the mechanisms of instrumental effects of open government initiatives is rare. Third, the preliminary literature review also indicates that qualitative research methods (e.g., interviews or content analysis) are the primary approach to investigate the potential impacts of open government. However, the main data collection approach in prior studies has been
to interview practitioners of open government initiatives and to build the analysis based on interviewees’ “perceived” impacts instead of on users’ experiences or quantified data (e.g., governmental performance). This limited approach to data collection could generate further concern regarding internal validity. Finally, no shared findings exist across these empirical studies, especially as quantitative studies are more likely to demonstrate negative or mixed effects.

4.2 Research questions and significance

While open government initiatives continue to expand, the central concern—whether these initiatives are actually impacting the quality of democratic governance—has not been appropriately addressed (Hansson, Belkacem, & Ekenberg, 2015). The framework-of-governance model provides a unique opportunity to holistically review the governing structure formed by open government initiatives from three levels of analysis. However, the brief literature review in the preceding section demonstrates the related research gaps regarding conceptualization, determinants, and impacts. Based on these research gaps, the following section describes the research questions of this dissertation and their significance.

4.2.1 Macro level: The conceptualization of the governance model

The first research question of this dissertation asks how the governance model of open government is conceptualized to cope with social problems. The process of conceptualization is an essential element of academic research. When a novel concept is faced, a series of validation procedures is required for academic examination to prevent the research from being redundant because of other well-conceptualized concepts (Vigoda-Gadot, Eldor, & Schohat, 2013). These procedures must therefore illuminate how a non-
overlapping concept has a close relationship with other terminologies but different meanings (Vigoda-Gadot, Eldor, & Schohat, 2013). However, the conceptualization of open government could be more difficult, since the concept was not drawn from a rigorous theoretical basis (Wirtz et al., 2018; Zuiderwijk & Janssen, 2015), and a variety of practices have been carried out by diverse actors at different levels of government (Chatwin, Arku, & Cleave, 2019). Therefore, this dissertation aims to specify how the concept of open government has been conceptualized in the literature in varying ways, especially in empirical studies addressing the related practices at different levels of government—federal, state, and local. In addition, while this dissertation refers to open government as a governance model, the discussion of this research question places emphasis on how the relationships between government and civil society have been reshaped based on these various practices.

In addressing this research question, this dissertation contributes to the growing literature that attempts to refine our understanding of open government (e.g., Wirtz & Birkmeyer, 2015; Yu & Robinson, 2012). The potential contribution is twofold. First, a clear understanding of the conceptualization of open government can not only prevent potential conceptual and methodological issues for academic studies but also provide a common ground for further theoretical and practical discussion. Second, unlike some prior literature reviews of open government investigating the research trend, the systematic review of this dissertation mainly focuses on the dynamics of macro, meso, and micro aspects of open government and accordingly examines the issues of conceptualization, implementation, and impact.

4.2.2 Meso level: The determinants of adopting the governance model
The second research question of this dissertation seeks to identify which determinants lead public organizations to adopt the governance model of open government. As previously mentioned, open government initiatives have been widely implemented in the US. However, it must be noted that certain initiatives at the federal level do not include the related compulsory mandates or permanent institutional settings to lead the implementation at federal or lower-level government (Amsler & Foxworthy, 2014); this provides flexibility for public organizations at every level of government to determine whether it is appropriate to implement or how to do so. In this study, determinants or drivers of open government implementation can be divided into supply (i.e., organizational resources) and demand (i.e., citizens’ preference) categories. While prior literature has mainly focused on determinants in the supply category, this dissertation will further analyze the demand-based determinants. This group of determinants mainly addresses how public organizations respond to their social-political context. This dissertation explores how public needs and the demands they place upon public institutions can influence the implementation of open government initiatives and the construction of a collaborative governing structure.

An examination of the determinants of open government initiatives is essential to understand the relationship between such initiatives and the constructed collaborative governing structure. According to the framework-of-governance model, not only are public organizations at the meso level steered by macro strategies, but they also impact the actors at the micro levels through various policy tools. Based on this context, the discussion of determinants can be used to specify how macro strategies influence implementation at the
meso level and how the implementations at the meso level affect those individuals at the micro level.

4.2.3 Micro level: The impact of the governance model on individuals

The third research question of this dissertation is as follows: Can open government initiatives really empower individual users who are involved in the collaborative governance model of open government? This question sheds light on individuals at the micro level of the governance model. In general, the governance model of open government is operated based on macro strategies and the related implementation by meso public organizations. Different strategies and corresponding implementations have a common goal, namely to involve individuals in public affairs, despite proposing distinctive mechanisms or mediums. The diverse mechanisms or mediums not only increase the complexity of the governance model but also impede practitioners’ or researchers’ exploration of its potential impacts. Considering that individual citizens are the primary users of open government services but have been neglected in prior empirical studies, this dissertation will specifically target those individuals who have been involved in the governing structure. Moreover, it aims to determine whether access to open government services can really alter individuals’ behaviors or attitudes according to the initial overall design of the governance model.

The examination of this research question not only expands the literature on the impact of open government (e.g., Aitamurto & Chen, 2017; de Kool & Bekkers, 2015) but also makes potential contributions. First, while individuals are regarded as the micro level of a governing structure, examining them provides an opportunity to validate whether the governing structure is formed according to the settings of macro strategies or meso
implementations. More importantly, the empirical findings of this research question can also provide policy implications for meso organizations to determine whether current implementations of open government need to be improved.
Chapter 3. A decade of open government research: A systematic review

1. Introduction

Open government is a recent public management reform trend aiming to establish transparent and collaborative governing structures that differ from market- or bureaucracy-oriented principles (de Blasio and Selva 2016; Ingrams, Piotrowski, and Berliner 2020). Although the term “open government” is not new and its origin can be traced back as early as Park’s pioneering research in 1957 (Ganapati and Reddick 2014; Yu and Robinson 2012), varying social contexts and advanced technologies have contributed to an evolution in the way open government is conceptualized.

Open government was first used to emphasize the importance of openness and information dissemination in a post-WWII context, where government accountability was weakened due to the need for flexibility and to mobilize military resources (Park 1975; Yu and Robinson 2012). In contrast, the modern definition of open government can be traced back to the Obama administration (2009-2017) and is centered on the intensive use of information and communication technologies (ICTs) to facilitate government transparency, civic participation, and public collaboration (McDermott 2010). Even though the concepts of transparency and citizen participation have been studied for decades in the field of public administration (see Cucciniello, Porumbescu, and Grimmelikhuijsen 2017; Skocpol and Fiorina 2004), advanced ICTs have changed interactions between government and the public; this particularly applies to how government information is disseminated and how the public participates in public affairs.

In light of such rapid developments over the past decade, there is a need to take stock and consider how such contextual changes have impacted the way scholars and
practitioners think about open government. Unfortunately, comprehensive assessments are missing from the extant body of open government research. The majority of literature reviews tend to focus on one specific policy tool of open government instead of treating it as a multidimensional concept, which could result in fragmented views; furthermore, some dimensions have received little attention (Grimmelikhuijsen & Feeney 2016).

To address this gap in the literature and contribute to a more integrated and comprehensive body of open government knowledge, this study follows the prior chapter of theoretical review to carry out a multilayer analysis of open government based on Roberts (2020). This multilayer analytical framework features a clear specification regarding micro- (individual), meso- (organizational), and macro- (regime) level units of analysis and provides insight into systematically evaluated relationships between the different layers. Based on this framework, three interrelated research questions were formed to guide this study: (1) How is the concept of open government defined and conceptualized at the macro level? (2) How is open government being used and implemented at the meso level? and (3) What outcomes/impacts have been attributed to open government initiatives at the micro level? These research questions are believed to address the dispute in the literature of how open government should be conceptualized at the macro level. In addition, the research questions pinpoint the related research gaps of

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3 For example, Kornberger and colleagues describe open government as an “en vogue yet vague” concept and state that “practitioners, policy makers, and others praise its virtue, but little is known how open government relates to bureaucratic organizations” (2017: 179). Another example is taken from Wootten and Kiss, who believe that “the meaning of open government remains highly ambiguous and contested” (2019: 480), because the concept of open government is “multidimensional and is linked to many other valued concepts such as accountability, transparency, better governance and participation” (2019: 482). Another widely-cited argument is proposed by Yu and Robinson, who further indicate the potential risk of defining open government based on employed technologies, because “a regime can call itself ‘open’ if it builds the right kind of website—even if it does not become more accountable or transparent” (2012: 178).
prior meso- and micro-level studies, laying the foundation for the following two chapters of this dissertation.

To examine these research questions, this article adopts the principles of Preferred Reporting Items for systematic reviews and meta-analyses (PRISMA, see also Cooper 2015; Liberati et al. 2009) to conduct a systematic review of open government studies published in the past decade. Because of its predetermined data collection protocols and pre-specified eligibility criteria, PRISMA is a reliable method that prevents potential collection bias (Cooper 2015; Liberati et al. 2009). The review’s final analysis included a total of 189 articles from the fields of public administration and political science.

Regarding the research findings, the analyses indicate that, while there are concerns about conceptual ambiguity in the literature (e.g., Yu and Robinson 2012), these concerns are not apparent in this systematic review as the definitions used by prior studies (e.g., Meijer, Curtin, and Hillebrandt 2012) tend to emphasize the importance of both data dissemination (vision) and civic participation (voice). Thus, at the macro level, the review reveals considerable cohesion in terms of how open government is conceptualized. In answering the second research question, regarding implementation, prior studies might address data disclosure and transparency but focus far less on participation (e.g., e-petitions) and collaboration (e.g., crowdsourcing). Most notably, this disproportionate focus on data disclosure is repeatedly seen in empirical studies of open government practices across different levels of government in various countries (e.g., Criado and Ruvalcaba-Gomez 2018); this demonstrates that there is an obvious gap between conceptualization at the macro level and implementation at the meso level. Finally, as regards the impact analysis, this article also confirms that empirical evidence on the
potential impacts of open government initiatives, on either individuals or groups, has been limited by being principally derived from research undertaken with a qualitative approach. Moreover, insufficient empirical evidence has led to concerns regarding generalizability at the micro level. After a discussion of the potential factors contributing to the above phenomena, a future research agenda is suggested in the conclusion.

2. Methodological Approach

The systematic review method or PRISMA uses a pre-determined systematic process to review the state of the art for a specific body of research. By creating concise summaries of existing evidence and research, systematic reviews are believed to provide reliable and accurate findings for communities of both practice and research (Cooper 2015; Liberati et al. 2009).

The PRISMA Statement requires scholars to demonstrate pre-specified eligibility criteria to conceive of a reproducible methodological approach and synthetically analyze the collected literature in order to decrease potential biases (Liberati et al. 2009). Because of its transparent and rigorous data collection protocols, the techniques of the PRISMA Statement have been widely used in diverse disciplines (Cooper 2015; Liberati et al. 2009). Scholars of public administration have also gradually applied PRISMA to review multiple topics, such as transparency (Cucciniello, Porumbescu, and Grimmelikhuijsen 2017), public service motivation (Ritz, Brewer, and Neumann 2016), coping (Tummers et al. 2015), and co-production (Voorberg, Bekkers, and Tummers 2015).
2.1 Eligibility Criteria

Including a series of eligibility criteria is one of the most important features of PRISMA (Liberati et al. 2009). Eligibility criteria must be clearly indicated to ensure that target research can be included and certain searching outcomes are reproducible. Based on the PRISMA Statement (Liberati et al. 2009), the study and report eligibility criteria are articulated as follows.

2.1.1 Study eligibility criteria

**Topic of open government.** To precisely identify open government research, a single keyword, open government, was used to search for each study’s title, abstract, and listed keywords, which enabled the inclusion of studies focusing on “open government data,” “open government initiative,” or “open government partnership.” An article was included for further analysis only when the above keywords were used in its title, abstract, or author-identified keywords (see also Alryalat et al. 2017). This research strategically focuses on “self-identified” open government studies through a deductive instead of an inductive approach. This deductive selection strategy has been utilized by other systematic reviews in the field of public administration (e.g., Ritz, Brewer, and Neumann 2016) and is believed to ensure the inclusion of articles with a strong connection to open government.

**Study design.** Based on Cucciniello, Porumbescu, and Grimmelikhuijsen (2017), the present article includes both theoretical and empirical studies. It is important to comprehensively review how the concept of open government is understood and how its

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4 This research conducted searches using both a single keyword (open government) and a combination of multiple keywords (open government data, open government partnership, and open government initiative). The search results obtained were the same.
impacts are hypothesized and measured, especially given that the development of open government research is still relatively immature. Following the same logic, this article is not biased towards empirical studies conducted by either qualitative or quantitative approaches. Moreover, the author believes that documenting and analyzing the research design from each study can not only demonstrate the current development of open government research but also indicate the potential direction for future research.

1. Report eligibility criteria

**Publication year.** The present article focuses on literature published between 2008 and 2019. Publications in this period began in January 2009 by highlighting the Obama administration’s *Open Government Memorandum*. Focusing on a specific period is believed to decrease selection biases.

**Language.** Considering the practical difficulties of translation and replicability (Voorberg, Bekkers, and Tummers 2015), this research only includes English-language articles.

**Data collection.** Based on the framework provided by Cooper (2015), two strategies were used to identify the literature eligible for further analysis. First, to include a broad spectrum of research, an electronic search was simultaneously conducted on two primary social science databases: “EBSCOhost” and “ProQuest Social Science Premium.” This online search was conducted in March 2019 and generated 696 possible studies. Second, considering that these two databases might not provide real-time updates for new publications, it was necessary to supplement the search results of the first stage by conducting a manual search focusing on high-impact journals in the field. For example,
related studies published after 2017 in Government Information Quarterly cannot be found in these two databases. Thus, the author consulted with experts\(^5\) in the field to locate recommended journals that regularly publish open government research. In total, the experts suggested five journals\(^6\) in the field of public administration and e-government to conduct a manual search on a journal-by-journal basis, and 146 articles were identified. Based on the aforementioned strategies and eligibility criteria, a total of 842 articles were identified through an online database and manual searches.

This research only considers peer-reviewed articles published in public administration and political science journals. The criteria have two purposes. First, focusing on peer-reviewed articles can ensure the collection of high-quality research, which is a common criterion that can be found in other systematic reviews (e.g., Ruijer and Martinius 2017). Second, focusing on two primary disciplines can enable the inclusion of studies that share similar ontologies or epistemologies, increasing the reliability of findings. Certain selection strategies from other systematic reviews in the field of public administration can also be used (e.g., De Vries, Bekkers, and Tummers 2016). However, these two strategies face some limitations: for example, focusing on peer-reviewed articles may miss studies with less significant findings, since these types of studies may be more difficult to publish (Ritz, Brewer, and Neumann 2016). Moreover, while research on open government has been

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\(^5\) This method of conducting manual searches after consulting with experts in the field can also be found in other systematic review research (e.g., Cuciniello, Porumbescu, and Grimmelikhuijsen 2017). Four experts were asked to provide recommendations for the supplemental manual search. These experts have consistently published papers addressing the issues of open government, e-government, and ICTs.

conducted in multiple disciplines (e.g., information science), focusing on two disciplines may cause the mistaken belief that relatively few studies have been published.

2.2 Review Method and Coding

The author further follows the PRISMA selection process provided by Liberati et al. (2009) to briefly review the 842 articles collected from online databases and manual searches and to identify the articles for the final systematic analysis (as shown as figure 2). Firstly, for those collected records, the title and abstract of each article were screened to exclude those articles that did not match the aforementioned criteria and drop duplicates. Secondly, the author screened the full abstract and text to further exclude articles that failed to meet the eligibility criteria (e.g., an overview essay/introduction of a special issue). Eventually, after excluding duplications and checking the eligibility, a total of 189 studies were included for the final systematic overview.

![Figure 2. PRISMA flowchart](image_url)
Moreover, this research used a novel data extraction form (as shown as Table 1 in Appendix 1) to articulate what elements of a collected record will be coded based on the related literature. These extraction items include (1) an article’s basic information (e.g., title, author, publication year, and journal’s name); (2) the listed keywords, if any; (3) the level of open government (e.g., national, federal/central, state, regional, or local); (4) the geographic context of open government (e.g., Asia, North America, Latin America, or Europe); (5) the theoretical basis; (6) the research question; (7) the research method; (8) the definition of government; (9) the impacts of open government; and (10) the technology/policy tools used to fulfill the objectives of open government.

For the coding process of the definition and potential impacts of open government, which are derived from the research questions of this article, the author did not develop a pre-specified categorization framework, since the related literature might not be sufficient to support a rigorous classification. Instead, the related information was collected, and then an inductive approach was used to classify the collected definitions and impacts.

In addition, the entire coding process was conducted by a single coder, the author. After the first twenty articles were coded as the preliminary attempt, the author consulted with experts in the field, once again, to make sure the extraction form was appropriate. The coding process was finished in June 2019.

3. Descriptive Results of the Systematic Review

Before responding to the research questions, this section provides an overview of the collected articles. The collected 189 articles were respectively published in 42 peer-review international journals. Among these 42 journals, open government studies have been
mostly published in five sources (as shown as Table 4): Government Information Quarterly (GIQ), Information Polity (IP), Transforming Government: People, Process, and Policy (TGPPP), Social Science Computer Review (SSCR), and International Journal of Public Administration (IJPA). These five journals have published 120 articles since 2008 (collected from either online data bases or manual searches), which is 63% of the 189 articles used for the final analysis. It was also found that open government studies are more likely to be published in journals covering both information science and public administration (e.g., IP and GIQ) instead of traditional generic public administration journals\(^7\). These phenomena may be caused by the fact that open government initiatives rely on information and communication technologies as policy tools (Bertot, Jaeger, and Grimes 2010; Luna-Reyes, Bertot, and Mellouli 2014; Wirtz, Weyerer, and Rösch 2018).

The following sections respectively articulate the publication trends, geographic context concerning government levels in the selected cases, the research method, and the keyword analysis.

### Table 4. Top 5 journals with most publications of open government

<table>
<thead>
<tr>
<th>Journals</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government Information Quarterly</td>
<td>62</td>
<td>32.80%</td>
</tr>
<tr>
<td>Information Polity</td>
<td>27</td>
<td>14.29%</td>
</tr>
<tr>
<td>Transforming Government: People, Process and Policy</td>
<td>12</td>
<td>6.35%</td>
</tr>
<tr>
<td>Social Science Computer Review</td>
<td>10</td>
<td>5.29%</td>
</tr>
<tr>
<td>International Journal of Public Administration</td>
<td>9</td>
<td>4.76%</td>
</tr>
<tr>
<td>Sub total</td>
<td>120</td>
<td>63.49%</td>
</tr>
</tbody>
</table>

\(^7\) This review identifies eight articles in Public Administration Review and The American Review of Public Administration over the past decade.
3.1 Publications overtime: A steady rise over the past decade

A steady rise in the publication of open government studies can be observed over the past decade (as shown as Figure 3). Between 2008 and 2009, there were only five articles related to open government, which, rather than emphasizing participation and ICTs, mainly focused on a freedom of information (FOI)\(^8\) perspective. The first increase can be observed after *Open Government Directive* was signed at the end of 2009. This executive order directly requires federal agencies and executive departments to take actions that further the goals of open government through using advanced ICTs (Ganapati and Reddick 2012; McDermott 2010; Wirtz and Birkmeyer 2015). In 2011, eight governments created an international organization called the Open Government Partnership (OGP), which is committed to achieving open government initiatives and has attracted the participation of more than 70 countries. The flourish of open government practices directly facilitated a proliferation of publications related to open government research. Between 2010 to 2014, the annual amount of publications had increased from 7 to 22 articles and entailed diverse topics, such as citizen-sourcing (e.g., Nam 2012), open government data (e.g., Napoli and Karaganis 2010), and social media (e.g., Linders 2012).

Although there was a minor decline in 2016, the number of publications reached their peak in 2017 (38 articles). A declining trend can be observed in 2018. Whether this declining trend will continue and whether academic research will be influenced by this should be kept under observation.

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\(^8\) These early studies (three out of five) may center on China’s policy and *Open Government Information Regulations* (e.g., Piotrowski et al. 2009), which deals with regulations pertaining to the release of government information and is similar with the FOIA in the US.
3.2 Geographic context

The present article tracked the geographic context of the selected case for each article and found that open government research mainly focused on the regions of North America and Europe. The research from these two regions occupies more than 65% of total publications (as shown in Table 5). Contrastingly, research focused on Asia and a cross-national comparison was close to or lower than 15% respectively. Moreover, the studies of Africa, Australia, and international organizations are less than 5%. These findings echo the other systematic review focusing on the issue of transparency conducted by Cucciniello, Porumbescu, and Grimmelikhuijsen in 2017; they also found a “predominant focus on North America and Europe” that could be caused by the eligibility of English-written articles and reduced investment in developing countries.\footnote{This article identifies two possible explanations for this. The first reason, and maybe the most important one, is the barrier of language. The eligibility criteria of this review only allowed for English articles. Since English is not the official or popular language in the low-publication regions, it may miss those studies written in non-English languages. Secondly, the development of open government is significantly connected to the ICT abilities and economic resources. Those developing countries—predominately from low-publication regions—might be less likely to implement open government initiatives and to provide valid experiences to study. For example, in Africa, only seven countries participate in Open Government Partnership.}

Figure 3. Peer-reviewed open government journal articles
Table 5. Open government research by geographic context

<table>
<thead>
<tr>
<th>Region of the selected case in article</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>North America</td>
<td>51</td>
<td>31.88%</td>
</tr>
<tr>
<td>Europe</td>
<td>42</td>
<td>26.25%</td>
</tr>
<tr>
<td>Asia</td>
<td>25</td>
<td>15.63%</td>
</tr>
<tr>
<td>Cross-national comparison</td>
<td>20</td>
<td>12.50%</td>
</tr>
<tr>
<td>Latin America</td>
<td>10</td>
<td>6.25%</td>
</tr>
<tr>
<td>Africa</td>
<td>5</td>
<td>3.13%</td>
</tr>
<tr>
<td>Australia</td>
<td>4</td>
<td>2.50%</td>
</tr>
<tr>
<td>International organization</td>
<td>3</td>
<td>1.88%</td>
</tr>
<tr>
<td>Total</td>
<td>160</td>
<td>100.00%</td>
</tr>
<tr>
<td>Not Specified</td>
<td>29</td>
<td>--</td>
</tr>
</tbody>
</table>

3.3 Government level of the selected case

Besides the geographic context, this systematic review also documented the government level of the selected case for each empirical study. In general, the government level can be divided into six groups: (1) national level (focusing on the open government implementation of a country as a whole), (2) federal and central level (focusing on the implementation of central level or federal agencies)\(^{10}\), (3) State or province level, (4)

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\(^{10}\) This systematic review differentiates the national and central levels to classify those studies that focus on either a specific country overall or the specific agency or agencies in federal or central government. For example, Lee, Díaz-Puente, & Martin (2019) examined the impact of open government on social prosperity across 96 countries, which is classified as comparative national-level research. Conversely, Henninger (2017) focused on the information access policy of one particular federal agency—the Australian Department of Broadband, Communications and the Digital Economy—which is classified as a federal- or central-level analysis.
Metro/or regional level\textsuperscript{11}, (5) city or local level, and (6) others\textsuperscript{12}. According to Table 6, most attention has been paid to federal or central government cases, followed by local-level and national-level research. It is important to notice that federal and national-based publications occupy almost 49\% of total publications. This gap between national or central level and local level publications may be explained from a resource perspective. That is, local governments may lack essential resources, both human and economic, to implement open government initiatives (Adu et al. 2018; Ingrams 2017a; Martin 2014), which represents a case for further study.

<table>
<thead>
<tr>
<th>Level</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>National</td>
<td>34</td>
<td>17.99%</td>
</tr>
<tr>
<td>Federal/ central</td>
<td>59</td>
<td>31.22%</td>
</tr>
<tr>
<td>State/ province</td>
<td>17</td>
<td>8.99%</td>
</tr>
<tr>
<td>Metro/ regional</td>
<td>7</td>
<td>3.70%</td>
</tr>
<tr>
<td>City/ local</td>
<td>54</td>
<td>28.57%</td>
</tr>
<tr>
<td>Others</td>
<td>2</td>
<td>1.06%</td>
</tr>
<tr>
<td>Not specified</td>
<td>42</td>
<td>22.22%</td>
</tr>
</tbody>
</table>

3.4 Research method: preference on an empirical and qualitative approach

The research approaches of the collected articles predominantly utilized empirical and qualitative approaches over the past 10 years. As shown in Figure 4, the empirical approach

\textsuperscript{11} For some empirical studies, researchers might focus on a metropolitan or regional area that consists of several cities. For instance, Khayyat and Bannister (2017) focused on the model of open government data implemented in the “greater Dublin area in Ireland,” which covers four local authority areas and two open data portals. This form of research tends to address a combined jurisdictional area from the perspective of regional development, which exceeds the jurisdiction of one city or local government.

\textsuperscript{12} For example, in the article of Hubbard and Xiao (2017), the research case is Chinese state-own enterprises; in Lourenço’s research (2013), it covers Portugal’s public enterprise hospital, foundations, and public sector enterprises.
has been dominant since 2010. Empirical studies occupy around 80.42% of total publications. On the contrary, the proportion of conceptual studies is only 13%. Additionally, the related literature reviews have existed since 2012 and were most prevalent in 2015 and 2017, because the number of publications for review accumulated.

![Analytical methods by year](image)

**Figure 4. Analytical methods by year**

The predominance of empirical studies is understandable since scholars may prefer to include empirical cases to better articulate the evolving concepts or practices of open government and depict the scope of the research field. However, publications of conceptual research have remained at a relatively low level over the past decade, especially from 2016 to 2018. Moreover, among these 189 collected articles, the author also found that only 46 articles (24%) clearly indicated theoretical frameworks (e.g., social influence and social judgment theory used by Liu 2017) to construct their hypotheses. This phenomenon could be caused by two possible factors: first, a limited number of theoretical frameworks have been used, because the field of open government is still forming its own theoretical basis; second, current research is built based on a similar conceptual baseline. For example, the
theory of innovation diffusion has been applied in studies on the adoption of open
government initiatives (see Chatfield and Reddick 2017; Estermann 2018;
Grimmelikhuijsen and Feeney 2017; Mcnutt et al. 2016; Yang and Wu 2016), and the
framework of e-government maturity can be found in studies evaluating the developing
progress of open government (see Adu et al. 2018; Estermann 2018; Lee and Kwak 2012;
Maseh and Katuu 2017; Susa et al. 2015).

Figure 5. Research methods by year

The present article also tracked the applied research methods for 189 collected articles
and found that scholars tend to answer the research questions through a qualitative
approach (as shown in Figure 5). In total, around 77.45% (146 articles) of the collected
publications were conducted through a qualitative approach, followed by 19.58% of
quantitative studies, and 3.17% of mix-method research. Among those qualitative studies,
popular research methods include content analysis, interviews, and document analysis.
4. Main Findings for Research Questions

The three research questions are based on the multilayer analytical framework (Roberts 2020) and aim to systematically review the conceptualization, implementation, and impacts of open government. Open government can be understood as an administrative reform, which aims to establish a new governing structure that differs from traditional Weberian bureaucracy and New Public Management (de Blasio and Selva 2016; Ingrams, Piotrowski, and Berliner 2020). Because of its inherent complexity (Ingrams 2017b) and the complicated interactions among diverse stakeholders from different levels of government, this systematic review of open government requires multilayer framework analyses to establish a better-developed research field and provide a more comprehensive observation (Howlett 2009; Jilke, Meuleman, & Van de Walle 2015; Roberts 2020).

The multilayer analytical framework (Roberts 2020) features two characteristics: (1) comprehensively identifying the research units at different levels and (2) explicitly addressing the relationships between different levels of analysis. In general, the research units of the multilayer analysis can generally be divided into three levels, which respectively address the grand social system, implementing organizations, and the impacted individuals (Klijn et al. 2013; Michels and Meijer 2008; Raadschelders 2011; Roberts 2020). Following the framework of Roberts (2020) and focusing on the context of open government, this research defines each level’s research units as follows: (a) macro level: the general strategies or conceptualization of administrative reform (e.g., open government initiatives), (b) meso level: the consolidation or implementation of administrative reform (e.g., launching an open data portal), and (c) micro level: the attitudes or behavior changes of individuals caused by administrative reform (e.g., a greater
motive to participate; Jaeger and Bertot 2010). Based on these definitions, the three research questions focus on the conceptualization, implementation, and impacts of open government, respectively.

In addition, this multilayer analytical framework argues that there are interrelationships among three levels of analysis (Roberts 2020). On the one hand, the general strategies or conceptualization at the macro level not only provide guidelines for implementation at the meso level but also determine the potential impacts at the micro level. On the other hand, the implementation of behaviors at the lower levels may also influence the macro-level conceptualization reciprocally, because contestation procedures can be conducted to examine whether the implementation of overall strategies attains the proposed objectives (Roberts 2020). Analyzing impacts at the micro level produces “microfoundations” by linking individuals with macro- or meso-level characteristics (Jilke, Meuleman, & Van de Walle 2015), which is crucial to validate the conceptualized principles or objectives of open governments. This principle of reciprocal interrelationship is used to comprehensively analyze the research findings among three research questions.

4.1 Question 1: How the concept of open government has been defined and conceptualized in the literature

The process of conceptualization has been embedded in almost every discipline as an essential validation procedure to differ emerging concepts from prior well-conceptualized concepts in order to prevent redundancy and clearly indicate the research scope (Vigoda-Gadot, Eldor, & Schohat 2013). This socially-constructed process requires a long-term devotion to specify related academic research or practical proposition, which has to emphasizes the uniqueness of the emerging concept but also illustrate the relationships with
other related terminologies (Vigoda-Gadot, Eldor, & Schohat 2013). Failing to tackle the issue of conceptual ambiguity could “generates a false sense that we are all pulling together in one common, unproblematic endeavor (McGee & Edwards 2016: 6)” and erode the foundation for future research. After articulating concerns surrounding conceptual ambiguities in open government research, this section aims to review the definitions of open government in the literature and observe how open government is conceptualized.

4.1.1 Concerns over conceptual ambiguities in open government research

Concerns over conceptual ambiguities have been articulated repeatedly in the open government literature (Abu-Shanab 2015; Grimmelikhuijsen and Feeney 2016; Linders, Wilson, and Bertot 2012; McGee and Edwards 2016; Nolin 2018; Wirtz and Birkmeyer 2015; Yu and Robinson 2012). In their research, Wirtz and Birkmeyer (2015) can only identify six authors attempting to define what open government is and pinpoint that “the literature has no clear understanding of what the term open government captures in general and lacks even basic and integrative definitions (p. 381)”. The potential factors leading to this lack of conceptual refinement of open government are threefold: first, the emergence of open government lacks a theoretical basis to systematically structure open government knowledge and illustrate the related causal relationships among different elements (Nam 2015; Sandoval-Almazan and Gil-Garcia 2016); second, it is argued that a reliance on practices to conceptualize open government contributes to conceptual ambiguity because open government could be implemented in diverse ways, especially for early implementations of open government that intentionally allow for flexibility and the use of diverse technology-mediated applications (Yu and Robinson 2012); third, the ambition of simultaneously involving multiple goals and dimensions without clarifying their dynamics
has made open government a multidimensional construct whose development is impeded by conceptual ambiguity (Abu-Shanab 2015; Grimmelikhuijsen & Feeney 2016; Linders, Wilson, & Bertot 2012; Nolin 2018).

4.1.2 Findings from the systematic review

With regard to the few attempts made to define open government, after reviewing the 189 articles, it is surprising to find that only 38 articles (20%) provide a clear definition of open government. Of these 34 articles, only 10 articles attempt to provide an original definition instead of a recycled from citing other studies, which echoes the findings of Wirtz and Birkmeyer in 2005. For the rest of the studies, 37 articles (20%) defined the concept of “open government data” and the other 114 articles (60%) conducted their research without a definition. Studies without a definition tended to frame the research scope by either articulating the developmental history of “open government”, “open government data”, or introducing the selected empirical case. These studies may define a specific aspect of open government (e.g., transparency) (Ruijer and Huff 2016) or focus on a specific type of implementation (e.g., crowdsourced deliberation) (Aitamurto and Landemore 2016).

For those 34 articles with a definition, the author used an inductive approach to divide them into two primary groups. The first group of definitions (identified in 15 articles) was initially proposed by Meijer, Curtin, and Hillebrandt (2012), who argue that “open government is not only about openness in informational terms (vision) but also about openness in interactive terms (voice) (p. 10).” This definition emphasizes two elements: (1) information/transparency: whether government information is accessible to the public, and (2) participation: whether the opinion from the public can be heard through the related
participatory mechanisms. Some similar definitions have been used by other scholars. For example, Grimmelikhuijsen and Feeney (2016) define open government as “the extent to which external actors can monitor and influence government processes through access to government information and decision-making arenas. (p. 580)”

The second group of definitions (showing in 15 articles) tend to follow the spirit of an Open Government Directive (see McDermott 2010) to simultaneously cover three primary elements of open government initiatives: transparency, participation, and collaboration. For example, Ganapati and Reddick (2014) define open government as “the leveraging of ICT to achieve the three dimensions of transparency, participation, and collaboration (p. 366)”. In addition, the definition proposed by Wirtz and Brikmeyer (2015) is “a multilateral, political, and social process, which includes, in particular, transparent, collaborative, and participatory action by governments and administrations (p. 382)”. Regardless of whether it is original or recycled, these three elements have been widely used to define open government.

For the remaining articles, the proposed definitions fall into the above two groups of definitions: either being simplified to focus on one specific element (e.g., transparency) or being enriched by involving other related concepts (e.g., anti-corruption). The example of the former can be found in Matei and Irimia’s article (2014), where open government is defined as “the technique or techniques through which the principles of transparency and openness are given effect”. In contrast, Abu-Shanab’s article that aims to “re-engineer” the concept of open government, the proposed definition simultaneously includes the concepts of ICTs, accessibility of data, accountability, collaboration, and civic empowerment.
Based on this analysis, the conceptualization of open government may not be as complex as previously expected as it is rare to see a debate over competing definitions of open government. Conversely, the three basic elements illustrated in the Open Government Directive continue to dominate the conceptualization of open government.

4.2 Question 2: How is open government being used and implemented?

Besides the variety of definitions, how open government is being used and implemented is the other core question of this systematic review. Theoretically, the process of implementation can be understood as an essential phase regarding how to transform the conceptualized principles into practice and how to realize the predetermined objectives. According to the framework proposed by Roberts (2020), there should be an apparent connection between conceptualization and implementation, since the conceptualized principles reveal a blueprint for implementation. Practically, the issue of implementation not only echoes the objectives of open government initiatives but also determines the potential policy outcomes. Based on the Open Government Directive issued in December 2009, the open government plans proposed by federal executive agencies should be concentrated on three policy principles: transparency, participation, and collaboration. These three principles have also been conceived as forming the three pillars of the open government concept (e.g., Abu-Shanab 2015; Veljković, Bogdanović-Dinić, and Stoimenov 2014). Although these three pillars could be further simplified into the two aspects of vision and voice (Meijer, Curtin, and Hillebrandt 2012), its central proposition to establish a transparent governing structure allowing empowered citizens to participate remains clear when conceptualizing open government. However, the related research specifying whether these three pillars or two aspects have been implemented evenly across
different cases has been limited. Thus, this section starts by articulating the disproportional case selection regarding open government implementation in literature and the uneven implementation in practices to demonstrate the existing gap between conceptualization and implementation.

4.2.1 Uneven case selection in empirical studies

In general, open government can be performed by either institutionally regulating how governments respond to citizens’ information or through participation requests (i.e., FOIA) or by practically using ICTs to more effectively release government information or facilitate participation. Reviewing the selected cases of the 153 empirical studies (as shown as Figure 6) shows that open government projects tend to rely on launching new technologies: 114 articles (75%) conducted their research based on a case of using new technologies. For example, Matheus et al. (2018) research the operation and design of “dashboard” technology, which is used to efficiently display the important information (e.g., performance) on governments’ websites. The other 12 articles focused on launching a new institution, usually through the implementation of regulations on releasing governmental information. For example, the article written by Piotrowski et al. (2009) introduces the implementation process of China’s Open Government Information Regulations, which is similar to the US’s Freedom of Information Act.

This systematic review further focuses on the technology-based articles to document the objectives of technology use. Following the aforementioned three pillars of open government initiatives (McDermott 2010), the 114 technology-based articles were first divided into three groups of objectives, namely data/transparency, participation, and collaboration. However, due to the complexity of open government applications, two more
groups—integration and general use of web technology—were created for classification to respectively represent the projects that integrated three pillars simultaneously and those that simply applied web-based technologies.

![Figure 6. The operationalization of open government](image)

Accordingly, 74 technology-based articles (65%) selected a case of using technology to achieve the goal of “open data”. In contrast, the goals of enhancing civic participation (14 articles, 12%) and collaboration (5 articles, 4%) have had less attention devoted to them. The examples of enhancing participation can be found through using social media (e.g., Wirtz, Weyerer, and Rösch 2018) or other online consultation/discussion platforms (e.g., Farina et al. 2014). The examples of collaboration can be observed from online crowdsourcing projects (e.g., Aitamurto and Landemore 2016). Finally, there have been 11 articles (10%) documenting a case of integration; for example, the discussion around using open government data to facilitate online crowdsourcing or participation (e.g., Khayyat and Bannister 2017). Thus, these findings indicate a possible unbalanced case selection for empirical studies where the selected cases tend to be technology and transparency-based.
<table>
<thead>
<tr>
<th>Authors/Year</th>
<th>Research Units</th>
<th>Country</th>
<th>Level of Government</th>
<th>Findings</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Criado &amp; Ruvalcaba-</td>
<td>The perceptions of city managers</td>
<td>Spain</td>
<td>Local (146 municipalities)</td>
<td>The perception of less attention concerning aspects of collaboration and participation.</td>
<td>General implementation</td>
</tr>
<tr>
<td>Gomex 2018</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>De Blasio &amp; Selva</td>
<td>Policy documents of national implementation</td>
<td>4 EU countries</td>
<td>Central (UK, France, Italy, &amp; Spain)</td>
<td>The implementation mainly stressed on innovation and openness, with occasional public-private collaboration, but ignored open decision making.</td>
<td>General implementation</td>
</tr>
<tr>
<td>2016</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gunawan 2015</td>
<td>Application of social media</td>
<td>Thailand</td>
<td>Central, provincial, &amp; local (172 public agencies)</td>
<td>Social medial is used for the dissemination of news updates but not for discussion or participation.</td>
<td>Social media</td>
</tr>
<tr>
<td>Janssen &amp; Zuiderwijk</td>
<td>Business models of open data and social media</td>
<td>Netherlands</td>
<td>NA (Focusing on website applications of both public and private sectors)</td>
<td>Open data apps aim to provide a predefined view of data; social media may be used for discussion but not a policy-making input.</td>
<td>Open data &amp; social media</td>
</tr>
<tr>
<td>2014</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mergel 2013</td>
<td>The perceptions of social media directors</td>
<td>U.S.</td>
<td>Federal (15 departments)</td>
<td>Bound by institutional hurdles, social media is generally used for broadcasting or disseminating government information.</td>
<td>Social media</td>
</tr>
<tr>
<td>Owen et al. 2013</td>
<td>The perceptions of 25 key stakeholders</td>
<td>UK</td>
<td>Central</td>
<td>The application of interactive approaches (e.g., social media) is still at a very early stage.</td>
<td>General implementation</td>
</tr>
<tr>
<td>Ganapati &amp; Reddick 2012</td>
<td>The perceptions of CIOs</td>
<td>U.S.</td>
<td>State</td>
<td>Open government is unevenly implemented and mainly focuses on the achievement of transparency.</td>
<td>General implementation</td>
</tr>
<tr>
<td>Chatwin, Arku, and</td>
<td>The submitted plans for implementing open government</td>
<td>15 countries</td>
<td>Local</td>
<td>The submitted plans of local governments participating in OGP consist of principles of open government.</td>
<td>General implementation</td>
</tr>
<tr>
<td>Cleave 2019</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ganapati &amp; Reddick 2012</td>
<td>The perceptions of chief administrative officers</td>
<td>U.S.</td>
<td>Local (110 municipalities across the U.S.)</td>
<td>Each principle of open government is evenly achieved.</td>
<td>General implementation</td>
</tr>
</tbody>
</table>
4.2.2 Uneven implementation of open government in practice

Unlike the aforementioned section, which aimed to demonstrate that researchers tend to select the transparency-based empirical cases while paying relatively less attention to the issue of participation and collaboration, this section examines the empirical studies that address the issue of evenness of implementation. After reviewing the abstract and introduction of 189 selected articles of this systematic review, a total of nine articles (as shown as Table 7) take the form of the empirical studies on evenness for further analysis. These 9 empirical studies can be divided into two groups: seven studies indicating uneven implementation centers on the aspect of transparency and information provision, while the other two studies exhibit impartial open government practices.

Concerning the empirical studies that indicated uneven implementation, a common research finding is that practitioners tend to invest more resources in achieving a higher level of transparency or in working on information dissemination; however, they neglect the fact that open government initiatives also require informed citizens to have access to either public participation or public service delivery processes. This research finding is drawn from the subjective perceptions of key practitioners (e.g., city managers; Criado & Ruvalcaba-Gomex 2018) or their objective observations on open government applications (e.g., social media websites; Gunawon 2015). In general, according to these empirical studies, this phenomenon can be found across different countries, different levels of government, and different employed tools. The phenomenon of uneven implementation can be found in those pioneering countries that embrace open government reform at an early stage (e.g., UK; Owen et al. 2013) and those follow-up countries (e.g., Thailand; Gunawon 2015). While central or federal governments may have relatively more resources
to implement, the issue of uneven implementation can still be found in both central (de Blasio and Selva 2016), state (Ganapati and Reddick 2012), and local governments (Criado & Ruvalcaba-Gomex 2018). More importantly, even though an interactive-based tool might be chosen—for instance, social media (Agostino 2013)—the real applications of this tool would still center on disseminating news updates rather than an input of policy-making or other meaningful participation (Gunawon 2015; Janssen and Zuiderwijk 2014; Mergel 2013).

Conversely, two empirical studies demonstrate the opposite results. After reviewing the implementation plans of 15 local governments submitted to the OGP, these plans are consistent with the impartial proposition of OGP (Chatwin, Arku, and Cleave 2019). The other empirical study, which was conducted in the early stage of open government reform, revealed the even achievements according to 110 chief administrative officers (CAOs) of municipalities across the U.S (Ganapati and Reddick 2012). However, these two empirical studies may require more research to reaffirm this counter-argument. Since OGP is an international nonprofit organization devoted to proposing open government reform, reviewing the submitted plans of member countries, which are more likely to commit to impartial development, may not represent the general practices. Additionally, as the 110 CAOs are satisfied with the achievements of all three principles, there is also an apparent drop in the group of highest satisfaction while evaluating the achievement of participation and governmental collaboration when compared with transparency achievement.

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This research uses a 5-level Likert scale to measure CAOs’ perceptions regarding the achievements of open government implementation; this includes very high achievement, high achievement, some achievement, low achievement, and very low achievement. Within the group of very high achievement, 39% of CAOs indicated a high achievement on implementing transparency, compared with 22.7% for participation, and 16.4% for G2G collaboration.
In short, although the related empirical studies regarding the evenness of implementation have remained limited, the initial findings indicate that the principle of transparency has attracted more attention compared with participation and collaboration. Notably, this research finding has been repeatedly found in cases with different countries, government levels, and employed tools.

4.3 Question 3: What outcomes or impacts are attributed to open government initiatives

This section focuses on the empirical studies and potential impacts, on either individuals or groups, attributed to open government initiatives. Specifically, this section aims to examine two central questions: (1) what theoretical effects have been caused by open government, and (2) what empirical evidence has been found?

In doing so, this research examines studies theorizing the effects of open government or disclosing empirical evidence. This article divides the potential impacts into three groups: one group comprises the effects on individual citizens, which echoes the micro-level analysis of the multilevel framework, while the other two consist of the collective-based or organizational-based effects on government and general society. This research created the category of general society to include these effects as some would be difficult to classify between citizens and government due to their complexity. For instance, the effects on collaboration or democracy may simultaneously influence both citizens and governments. The results of the systematic review are in Table 6, which highlights (1) the affected groups (e.g., citizens), (2) the potential effects (e.g., participation), (3) the frequency of empirical and theoretical studies that mention the specific theoretical effect,
(4) the frequency of empirical studies that provide empirical evidence for the given effect, and (5) the empirical findings.

4.3.1 Hypothesized impacts of open government

Based on the aforementioned criteria, this paper firstly demonstrates the overall distribution of potential effects addressed in the literature, which have not necessarily presented related empirical evidence. As shown in Table 8, each affected group contains six types of potential effects. Within the citizen category, which represents impacts at the micro or individual level, the most popular impact of open government initiatives is facilitating participation, followed by enhancing public trust and encouraging public deliberation. Altogether, 30 articles mention the theoretical effects of facilitating participation, cited mostly from the literature, while 10 discuss the effects of enhancing public trust (5%) and seven the effects of encouraging public deliberation (4%).

Concerning other collective-based impacts, commonly referenced theoretical effects in the government category include transparency (34 articles, 18%), accountability (25 articles, 13%), and performance (24 articles, 13%). Finally, the synthesis category includes theoretical effects that it is difficult to group as being citizen or government-oriented due to their complexity. These theoretical effects include economic value (18 articles, 10%), democracy (5 articles, 3%), social value (7 articles, 4%), or interaction (6 articles, 3%). When the frequencies of the theoretical effects in each category were compared, the government category proved to have attracted more attention than the others, and its theoretical effects are generally mentioned more often. Overall, there are a total of 75 articles (40%) citing the theoretical effects of open government initiatives, and a great majority of them center on the effects on government.
Regarding the hypotheses on the effects of open government, existing hypotheses usually center on the issue of open government data and treat it as an independent variable. This feature is understandable as the preceding section has demonstrated a transparency-driven focus in the literature and open government data has been considered as the primary policy tool to achieve open government in practice (Veljković, Bogdanović-Dinić, & Stoimenov 2014). One group of hypotheses tend to argue the “intrinsic effects” of open government data, which means the action of releasing governmental data online per se positively contributes towards democracy. The intrinsic effects of open government data include, but are not limited to, increasing the accessibility of governmental information, enhancing government transparency while making diverse government-related data available, and promoting accountability so the public can better monitor a government’s performance or behaviors (Chatwin, Arku, and Cleave 2019; Jaeger and Bertot 2010; Lourenço 2015; Magalhaes and Roseira 2017).

The other group of hypotheses regarding open government data contend that the related “instrumental effects” are caused by releasing data with a re-useable and machine-readable format. This group of hypotheses echoes the mobilization theory in prior e-government research, which mainly argues that the advanced ICTs enable individuals, especially previously-excluded ones, to have essential resources or capabilities for individuals to participate (Tai, Porumbescu, and Shon 2019). Similarly, open government data is believed to decrease information asymmetry and provide essential information for promoting public participation (Henninger 2017; Jaeger and Bertot 2010; Martin 2014; Ruijer, Grimmelikhuijsen, and Meijer 2017). The other hypothesized instrumental effects are derived from the features of re-usability and machine-readability of open government
data, and they encompass (1) improving people’s quality of life while data is used to make decisions (e.g., Ruijer, Grimmelikhuijsen, and Meijer 2017), (2) advancing the provision of public services enabled by data-driven practices (e.g., Chatwin, Arku, and Cleave 2019), and (3) spurring economic development while allowing novel applications powered by the private sector (e.g., Janssen and Zuiderwijk 2014).

Table 8. The theoretical impacts of open government research

<table>
<thead>
<tr>
<th>Groups</th>
<th>Effects</th>
<th>Articles (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Citizen (micro/individual)</td>
<td>Participation</td>
<td>30 (16%)</td>
</tr>
<tr>
<td></td>
<td>Trust</td>
<td>10 (5%)</td>
</tr>
<tr>
<td></td>
<td>Empowerment</td>
<td>7 (4%)</td>
</tr>
<tr>
<td></td>
<td>Inclusion</td>
<td>5 (3%)</td>
</tr>
<tr>
<td></td>
<td>Deliberation</td>
<td>3 (2%)</td>
</tr>
<tr>
<td></td>
<td>Satisfaction</td>
<td>2 (1%)</td>
</tr>
<tr>
<td>Government (collective/organizational)</td>
<td>Transparency</td>
<td>34 (18%)</td>
</tr>
<tr>
<td></td>
<td>Accountability</td>
<td>25 (13%)</td>
</tr>
<tr>
<td></td>
<td>Performance</td>
<td>24 (13%)</td>
</tr>
<tr>
<td></td>
<td>Innovation</td>
<td>15 (8%)</td>
</tr>
<tr>
<td></td>
<td>Decision making</td>
<td>8 (4%)</td>
</tr>
<tr>
<td></td>
<td>Corruption</td>
<td>3 (2%)</td>
</tr>
<tr>
<td>General society (collective/organizational)</td>
<td>Economic value</td>
<td>18 (10%)</td>
</tr>
<tr>
<td></td>
<td>Collaboration</td>
<td>10 (5%)</td>
</tr>
<tr>
<td></td>
<td>Social value</td>
<td>7 (4%)</td>
</tr>
<tr>
<td></td>
<td>Interaction</td>
<td>6 (3%)</td>
</tr>
<tr>
<td></td>
<td>Understanding</td>
<td>2 (1%)</td>
</tr>
<tr>
<td></td>
<td>Democracy</td>
<td>5 (3%)</td>
</tr>
<tr>
<td></td>
<td>Total articles (%)</td>
<td>75 (40%)</td>
</tr>
</tbody>
</table>

Note: The percentages demonstrated in the table were derived from the calculation of total collected articles, in which both empirical and theoretical studies are included.
Similar to the hypotheses relating to open government data, the other group of hypotheses also concentrate on one specific policy tool, the citizen-sourcing project, to argue its effects on promoting innovation. The citizen-sourcing project is a participatory-oriented mechanism that “enables public organizations to engage with voluntary citizens via online intermediary platforms seeking innovative ideas and solutions (Schmidthuber, Stütz, and Hilgers 2019: 489)” to assist with tasks or making decisions that are traditionally performed by public employees (Hilgers and Ihl 2010). This group of hypotheses generally echoes the resource dependency theory in organizational studies, which asserts the importance of involving diverse resources and preventing the dependence on a single source to increase effectiveness (Hillman, Withers, and Collins 2009). Thus, while diverse citizens with varying knowledge are involved through the citizen-sourcing project, their expertise can cause several impacts, including (1) democratic effects: increasing transparency and inclusiveness while diverse citizens participate in public affairs (Aitamurto and Chen 2017), and (2) epistemic effects: promoting innovations of public service and reducing programming costs while novel ideas are collected (Aitamurto and Chen 2017; Nam 2012; Schmidthuber and Hilgers 2018)

4.3.2 Empirical evidence on the impacts of open government

There is little empirical evidence that has been used to support the above theoretical impacts. Indeed, only eight studies that offer any evidence on these impacts have been identified (see Table 9); two articles examine the impacts of open government on individuals, while six assess its impacts on government and general society. The eligibility of these eight studies requires a clear research question regarding the effects, analysis, and the corresponding research method to be examined. While micro-level theories tend to
assume the positive effects on citizen’s participation and deliberation, the first round of research that focuses on the individual users of open government services might reveal conflicting evidence. A case study of Finland’s online crowdsourced legislative reform, which initially aimed to collect knowledge, shows the ability of open government movements to create a space for public deliberation (Aitamurto and Landemore 2016). The authors of this research used content analysis techniques to reveal that the participants of this crowdsourcing project exchanged diverse opinions and viewpoints, which to some extent mitigates the concern relating to potential bias caused by the composition of self-selected participants (Aitamurto and Landemore 2016). The other mixed-method research, conducted by de Kool and Bekkers (2015), shows the mixed effects of open government services. In the case of Dutch primary schools, the users of open government services (e.g., parents) visit the government-operated website to obtain the performance information of each primary school. On the one hand, the authors found that the frequency of parents’ visits can positively predict their desire to participate in educational affairs; on the other hand, it also showed that the frequency of visits is associated with reduced perceived performance (de Kool & Bekkers 2015).

Regarding the research on collective-based impacts, the second round of empirical studies investigates the effects of open government initiatives on government. Mainly employing qualitative methods, the empirical studies regarding the effects on government respectively entailed multiple aspects, including government innovation, public services delivery, corruption, and transparency. After interviewing 15 city managers in the US, Mergel, Kleibrink, and Sorvik (2018) revealed that the implementation of open government data not only triggered internal innovation by forming an innovative culture and conducting
procedural changes but also facilitated external innovations by providing new public services and website applications. Focusing on the case of the Kenyan judiciary’s open government initiatives, the qualitative research of Maseh and Katuu (2017) found that this initiative can improve justice delivery while allowing greater public participation.

Table 9. The empirical studies of impact analysis

<table>
<thead>
<tr>
<th>Analysis aspect</th>
<th>Impact</th>
<th>Method</th>
<th>Finding</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Citizens (micro/individual)</td>
<td>Public deliberation</td>
<td>Qualitative</td>
<td>Positive</td>
<td>Aitamurto and Landemore (2016)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Qualitative</td>
<td>Positive</td>
<td>Aitamurto and Chen (2017)</td>
</tr>
<tr>
<td></td>
<td>Participation</td>
<td>Quantitative</td>
<td>Positive</td>
<td>de Kool and Bekkers (2015)</td>
</tr>
<tr>
<td></td>
<td>Perceived performance</td>
<td>Quantitative</td>
<td>Negative</td>
<td></td>
</tr>
<tr>
<td>Government (collective/organizational)</td>
<td>Innovation (internal and external)</td>
<td>Qualitative</td>
<td>Positive</td>
<td>Mergel, Kleibrink, and Sorvik (2018)</td>
</tr>
<tr>
<td></td>
<td>Service delivery</td>
<td>Qualitative</td>
<td>Positive</td>
<td>Maseh and Katuu (2017)</td>
</tr>
<tr>
<td></td>
<td>Transparency</td>
<td>Qualitative</td>
<td>No effect</td>
<td>Gunawong (2015)</td>
</tr>
<tr>
<td>General society (collective/organizational)</td>
<td>Mutual understanding</td>
<td>Qualitative</td>
<td>Positive</td>
<td>Clarke and Margetts (2014)</td>
</tr>
<tr>
<td></td>
<td>Social prosperity (freedom, social capital, economy, and education)</td>
<td>Quantitative</td>
<td>Mixed</td>
<td>Lee, Diaz-Puente, and Martin (2019)</td>
</tr>
</tbody>
</table>

The final round of research focuses on collective-based and synthetic effects that might simultaneously concern citizens and government. Unlike the above empirical studies
mainly discussing the direct effects of the open government movement, this group of research argues that there are possible mediation effects caused by open government. Drawing on their findings from interviewing civil servants and researchers in three countries, Clarke and Margetts (2014) argue that the applications of open government data and big data can promote a mutual understanding between citizens and government, which is believed to be pivotal to improving public policies and services. Merging the data from multiple sources, an international analysis conducted by Lee, Díaz-Puente, and Martin (2019) indicated that open government movements can positively influence social prosperity, which was operationalized by measuring personal freedom, social capital, education, and economic development. However, this positive impact from open government can only be found through the mechanism of rule of law and control of corruption.

5. Discussion

The analysis of this systematic review demonstrates a sustained growth of publications regarding open government initiatives. The growth of academic studies was primarily stimulated by the explosive development of open government policies and implementations, which is mainly diffused from the US federal government and some key international organizations. There has been an apparent growth of open government research since 2012 after the Obama administration issued an executive order to require federal agencies to propose administrative plans to fulfil open government objectives in 2009. However, at this juncture, a systematic review is necessary to clarify the development of open government research after a decade of rapid growth. Following the multilayer analytical framework, this research not only strategically examines the related
issues of conceptualization, implementation, and effects but also attempts to depict the interrelationships among these three issues.

5.1 The conceptualization of open government

The first research question of this systematic review aims to understand how the concept of open government has been conceptualized in the literature. However, the preceding analyses and examples might not be able to find sufficient evidence to support the argument regarding the existence of conceptual ambiguity of open government. As relatively few articles (38 out of 189) proposed a definition of open government (either conceiving an original definition or citing one from prior literature), the proposed definitions are generally aligned with the three primary elements—transparency, collaboration, and participation—articulated in 2009’s Open Government Directive with some minor adjustments. Namely, researchers may be arguing whether “collaboration” should be treated as an independent element or just a part of “participation” (e.g., Grimmelikhuijsen & Feeney 2016).

This study attempts to provide some possible interpretations for the above findings. Firstly, the indicated low frequency of providing a definition should not be automatically understood as the existence of conceptual ambiguity. Conversely, it could be asserted that the definition of open government might not be as complex as some prior literature has indicated. The low-frequency phenomenon might be caused by the fact that many collected studies (37 articles) of this review tend to center on the issue of open government data and have fewer motives for defining what open government is. Some scholars also choose to describe a practical experience or trend of open government to illustrate the research scope
instead of accurately defining the specific concept, which may also avoid the difficulty of defining the evolving concept.

Secondly, another applicable approach is to examine the existing definitions to confirm the existence of conceptual ambiguity. Drawing on the argument of Yu and Robinson (2012), one possible cause of conceptual ambiguity is simply relying on the employed technologies to conceptualize open government: “A regime can call itself ‘open’ if it builds the right kind of website—even if it does not become more accountable or transparent” (Yu & Robinson, 2012: 178). However, based on the collected definitions of open government in this study, it is rare to find a definition that relies on technologies. Instead, although contemporary practices of open government initiatives rely significantly on the applications of advanced ICTs, scholars tend to neglect the role of ICTs when conceiving of their definitions (see also Hansson, Belkacem, and Ekenberg 2015). According to the collected definitions, researchers prefer to conceptualize by depicting the ideal modes, characteristics, and elements, or proposing normative objectives of open government.

Thirdly, and more importantly, the reliance on practices for conceptualization does not necessarily lead to conceptual ambiguity. Although there is a minor difference between the aforementioned two groups of definitions, regardless of whether the concept should be treated independently, both of these groups of definitions are derived from key policy documents—Memorandum on Transparency and Open Government (Obama 2009) and Open Government Directive (Orszag 2009). They attempt to conceptualize open government as a new governing structure, highlighting proactive information
dissemination (transparency) and accessible participatory mediums for decision making or public service provision (participation/collaboration).

For the proponents of involving three elements, collaboration and participation are two different aspects of open government. The former centers on how NPOs or the private sector can combine the process of public services delivery (e.g., crowdsourcing and co-production). The latter mainly focuses on how to participate in the decision-making process of government (e.g., online petition) (see also Mergel 2013). In contrast, other researchers (Abu-Shanab 2015; Grimmelikhuijsen and Feeney 2016) do not agree with the inclusion of collaboration, because traditional democratic theory has treated the features of collaborations as one kind of participation. Although debating the validity of these two groups of definitions is not the objective of this review, it cannot be ignored that some arguments did not change their conception of open government as being a governing structure embracing openness.

The highly aligned nature of this definition may be explained by the essence of the open government concept and other public administration topics—the nature of the field is applied and highly embedded with practical experiences (Ricucci 2010). Since the Obama administration, the concept of open government originated from administrative practices and has been differentiated from the concepts of “freedom of information” or the traditional e-government approach, which requires the academic community to utilize existing practices. Thus, aligning with the primary three elements of Open Government Directive might be the easiest way for scholars to operationalize the follow-up research and for practitioners to comprehend academic studies.
5.2 The implementations of open government initiatives

The preceding sections reveal a common phenomenon: Both the case selection in academic research and prior empirical studies tend to indicate the uneven implementation and transparency and data-driven focus, whereby “the focus is predominantly on transparency and information, while ignoring fundamental democratic issues regarding participation and collaboration” (Hansson, Belkacem, and Ekenberg 2015: 540). This transparency-driven focus has been uncovered in other studies of the literature review in the early stage of open government reforms (e.g., Hansson, Belkacem, and Ekenberg 2015; Evans & Campos 2013). As early as 2012, at the beginning stage of the open government initiative, a survey of each state’s CIO illustrates that they usually perceived the strength of the progress on implementing data-driven policies but paid less attention to developing the related mechanisms for civic participation and collaboration (Ganapati and Reddick 2012). Although the administrative reform of open government has been promoted for more than a decade, the issue of uneven implementation has remained and highlighted the gap between conceptualization and implementation.

Several studies collected in this systematic review attempt to explain the related factors that contributed to uneven implementation. The first group of factors centers on there being a lack of clear guidance specifying how to implement three principles of open government (Bertot et al. 2014; Evans and Campos 2013). For example, the Open Government Directive, which was the first executive order of open government reform in the US, mainly addressed the general principles of open government but did not specifically articulate how to implement them. Federal agencies or other sub-national governments may start with transparency-driven approaches—which can also be
understood as supply-driven approaches—since they do not rely on complex interactions with the public. Within the era of e-government, governments have accumulated an abundance of digitalized data online (Evans and Campos 2013). The transparency-driven approach may only require a new mechanism to re-organize and present the existing data instead of conducting an overall organizational change. Thus, releasing government information or non-confidential data could be conceived as an explicit and rapid response to this reform.

The second group factor is related to practitioners’ risk aversion and resource limitations (Dawes, Vidiasova, and Parkhimovich 2016; Grimmelikhuijsen and Feeney, 2016; Wirtz et al. 2016). The implementation of the principles of participation and collaboration requires intensive resource investment to collect and translate diverse opinions and to redesign the decision-making process (Nam, 2015), which could be contrary to the daily routines of practitioners and generate uncertainties. Combined with the first factor, it is unsurprising that the “symbolic” implementation of participation takes place in an environment where “collaborative engagement is … only identifiable in the active interactions of citizens with government-provided content: we do watch retweets” (Mergel 2013: 331).

The last group of factors addresses the radical differences and conflicts between open government and other governing structures, New Public Management and Weberian bureaucracy (de Blasio and Selva 2016). While open government initiatives aim to establish a collaborative governing structure (Amsler and Foxworthy 2014), they could collide with other long-lasting models emphasizing market mechanisms and enclosed decision-making authority; this could further hinder practitioners’ ability to evenly
implement the three principles. Instead of fully implementing the three principles, the practices of focusing on data provision or transparency are considered a critical step to work with prior neoliberalism practices that also stress the importance of privatization and commercialization of government information (Bates 2014; Catlaw and Sandberg 2014).

For practitioners, the transparency-driven approach may still be referred to as “the path of least resistance” or “the path with least required resources,” especially when the related open government initiatives are no longer being emphasized by the Trump administration. In the near future, while the dominance of the transparency or the data-driven approach can still be anticipated, the apparent gap between conceptualization and implementation may trigger a critical discussion on whether current practices of open government can be called “open.”

5.3 The empirical evidence of open government research

Based on preceding sections, an apparent gap can be found between hypothesized effects and corresponding empirical evidence, while the related effect analyses are limited. This gap could impede practitioners from devoting attention to open government implementation and also hinder the sustainable development of open government research. According to the multilayer analysis framework (Roberts 2020), the conceptualization proposed at the macro level could impact on the implementation and lead to a specific outcome. However, the implementation and identified outcomes could also reciprocally reshape the initial conceptualization. Without sufficient empirical evidence, academia might not be able to understand whether the conceptualized principles of open government can be implemented to achieve predetermined objectives and whether the rhetoric of open government needs to be reconceptualized.
This research also indicates that there is no shared finding that exists across these empirical studies. Instead, there has been a critical debate regarding the positive effect of open government data, which is the primary policy tool of open government initiatives. At the micro level, while preceding hypotheses tend to assume the positive effects of open government data (e.g., promoting participation or transparency) or other transparency-based tools based on mobilization theory (Gascó-Hernández et al. 2018; Jaeger and Bertot 2010; Ruijer, Grimmelikhuijsen, and Meijer 2017), this systematic review can only identify limited empirical support for certain mobilization theories (Gonzalez-Zapata and Heek 2015; Lourenço 2016; Martin 2014; Meijer, and Grimmelikhuijsen 2017; Wang and Lo 2016). Notably, some empirical studies, which might not examine the impact of open government directly, even indicate a low usage of open government data (de Kool & Bekkers, 2015; Wang, Shepherd, and Button 2019) and its reinforcement effects on participation (Susha, Grönlund, & Janssen, 2015). According to reinforcement theory, due to the requirement of digital skills, ICT-mediated public services may be exclusively employed by already empowered users but exclude the general public (Tai, Porumbescu, and Shon 2019). In the case of open government data, the literature indicates that users are usually skillful individuals or private organizations (e.g., hobbyists or app developers) but not ordinary citizens (Smith and Sandberg 2018; Zuiderwijk and Janssen 2015). Thus, the academic community requires more empirical studies to examine the real effects of open government data and other policy tools of open government initiatives.

More importantly, the review of empirical studies also demonstrates concerns surrounding research methodology. As shown in Table 8, qualitative research methods (e.g., interviews or content analysis) are the primary approach to investigate the potential
impacts of open government. Because of the general low usage of open government platforms (Paoli and Leone 2015), it is understandable that the main approach of data collection is to focus on practitioners of open government initiatives and to develop the analysis based on interviewees’ “perceived” impacts instead of users’ experiences or quantified data (i.e., governmental performance). However, relying on self-evaluations to measure the impacts of open government, especially for collective-based impacts, may be limited by their internal validity and lead to critical concerns of biased analyses. As a result, more approaches to data collection should be applied in empirical studies. For example, while the experiences of users are difficult to access due to low usage, scholars may attempt to use an experimental approach to compare the different outcomes after using open government services (e.g., Grimmelikhuijsen and Porumbescu 2017).

6. Conclusion and Future Research

Since open government became popular as a new wave of administrative reform in late 2008, practitioners and researchers have attempted to understand how this concept relates to public bureaucracies, advanced technologies, and democratic systems. Considering the existence of fragmented research findings, the present article aims to systematically review open government research from the past decade by conducting a PRISMA-based systematic literature review to analyze 189 articles published in peer-reviewed journals. The descriptive findings of this article not only demonstrate the flourishing development of open government research but also confirm that research on this topic (1) has been published primarily in five journals, (2) focuses on North America and Europe, (3) prefers to examine the federal or central government, and (4) usually employs qualitative approaches.
More importantly, this article intends to explore three interrelated issues of open government—conceptualization, implementation, and impacts—using a multilevel framework. After collecting 189 articles published in the last decade, this research indicates that the conceptualization of open government has been aligned with the specified administrative guidance and has been relatively unified. Namely, the open government concept is understood as a compound governing structure that consists of government transparency (vision) and active public participation or public-private collaboration (voice). However, this aligned understanding of open government is not fully realized in the implementation process. A technology- or transparency-driven emphasis has been not only demonstrated in the case selections of these 189 articles but also reflected in practice. The institutional arrangement or other participation- or collaboration-based technology uses (i.e., online crowdsourcing or e-petition) have attracted less attention. Moreover, this transparency-driven understanding of open government further hinders researchers from understanding the overall impacts of open government, either on organizations or individuals. This analysis indicates that the related empirical studies examining the impacts of implementing open government initiatives have been limited, and the accumulated evidence has been mostly derived by a single research approach.

Some scholars prefer to treat the open government movement as a “paradigm shift” because of its main characteristic of entailing both information dissemination and citizen participation or coproduction, which is different from prior market-centric New Public Management or government-centric traditional public administration (e.g., Linders, 2012; Ohemeng & Ofosu-Adarkwa, 2015). Before tackling the aforementioned concerns, it is still too optimistic to assert that the implementation of the open government initiatives can
trigger a paradigm shift in the field of public administration. On the one hand, while academia has gradually formed a shared understanding of open government to cope with the initial concern of conceptual ambiguity, it remains unclear why this shared understanding fails to be demonstrated in the implementation process or impact analysis. On the other hand, if the implementation of open government continues to focus on one specific aspect and the hypothesized impacts are not validated sufficiently, it may be necessary to discuss whether the current understanding of open government must be reconceptualized. While this article reviews the knowledge of open government that has been accumulated in the past decade, it also highlights those concerns before delivering the paradigm shift judgment. As a result, the related recommendations for future research in the field of open government are listed as follows:

1. Future empirical research should cover cases from previously-excluded areas or geographic contexts. Based on this research, relatively little attention has been paid to Asian and African countries.

2. The discussion of open government implementation should cover all levels of government instead of focusing on federal or city-level research. This research concludes that state-level or grass-root-level open government implementations were studied less. In addition, the variations of openness during implementation should also be examined to include the impacts from a variety of factors.

3. The field of open government, especially empirical studies, should be enriched by applying multiple research methods, such as quantitative, experimental approaches, or a triangulation-based method (i.e., qualitative comparative analysis [QCA]).
4. The studies regarding the potential impacts of open government should be largely expanded and should cover the pre-identified topics, including the issues of empowerment, civic inclusion, or mutual understanding.

5. The future research regarding the conceptualization of open government should also cover the related practices in the field. As mentioned above, open government has been understood as a multi-dimensional concept. For research purposes, this systematic literature review only centers on published academic studies rather than real practices, which may only demonstrate a partial picture of the concept. It is believed that examining related practices in the field, both in the public and nonprofit sectors, can generate some nuances for the issue of conceptualization.
Chapter 4. The configurational analysis of the determinants of open government implementation: A case of New Jersey school districts

1. Introduction

As a primary administrative reform in these two decades, open government movement not only pursues its intrinsic value to pursue greater transparency but also aims to fulfil other instrumental values promoting participation and collaboration (Meijer, Curtin, and Hillebrandt, 2012; Piotrowski, 2017). With these goals in mind, open government initiatives can be observed at almost every level of the US government (Chatwin, Arku, & Cleave, 2019), and more than 70 countries have joined the Open Government Partnership (OGP), a global and multilateral initiative promoting open government (Piotrowski, 2017). The concept of open government has been widely implemented by public organizations through a variety of approaches and mediums, from basic improvements to official websites (Bearfield & Bowman, 2016; Grimmelikhuijsen & Feeney, 2016; Yavuz & Welch, 2014) to a policy innovation via public participation (e.g., e-rulemaking; Stromer-Galley, Webb, & Muhlberger, 2012).

While countless public organizations are still trying to discover a better approach to achieve greater transparency and participation, it could be clearly found that the extent of openness among these approaches vary dramatically, but the related research on these potential variations has been limited (Altayar, 2018; Armstrong, 2011; Bearfield & Bowman, 2016; Grimmelikhuijsen & Feeney, 2016; Zhang et al., 2017). What can make public organizations implement open government initiatives? In particular, the discussion on the factors that lead to implementation represents a meso-level study that seeks to specify how the conceptualization of open government at the macro level can be effectively
translated to a meso implementation or real practices. Addressing this issue is critical because it not only provides a chance to evaluate whether the meso implementation involving transparency and interactivity features can improve the quality of government or government responsiveness (Moon, 2020; Pereira et al., 2017) but also contributes to practitioners by showing a list of successful factors for benchmarking.

However, existing studies on open government determinants have revealed several research gaps. First, prior research tends to disproportionally focus on supply-based determinants while paying less attention to demand-oriented or contextual factors (Dawes, Vidihasove, & Parkhimovich, 2016; Ohemeng & Ofosu-Adarkwa, 2015). Supply-based determinants mainly center on whether public organizations have sufficient capacities (e.g., fiscal resource) to implement open government; on the contrary, demand-based determinants represent whether the provided open government services can respond to public needs (e.g., the perception of government regarding citizen’s desire to contain government secrecy). Simultaneously examining these two types of determinants is critical for facilitating the validity of the theoretical model to explain the variations of implementation. Second, prior research prefers to center on one specific open government policy but does not treat open government as a multi-dimensional concept covering multiple aspects (Evans & Campos, 2013; Hansson et al., 2015; Grimmelikhuijsen & Feeney, 2016). As mentioned in the prior chapter, transparency- or data-driven research has dominated, which may neglect the fact that the implementation of open government initiatives also entails enabling greater public participation. Third, drawing mainly on conventional quantitative analysis approaches, prior research tends to examine the net effects of a specific “variable” instead of the dynamics of multiple “factors.” However, the
complexity of implementation process should not be ignored—different combinations of factors may also lead to a successful implementation, and there should be distinct examinations addressing different dimensions of open government respectively (Grimmelikhuijsen and Feeney 2016).

To cope with these issues, the present paper employs a configurational approach and complexity theory (Pappas & Woodside, 2021; Ragin, 2008; Teisman & Klijn, 2008) to construct an integrative theoretical framework to include multiple supply- and demand-based factors that lead to open government implementation. The primary feature of complexity theory is highlighting the dynamics of the examined phenomena. It focuses on the non-linear interactions between external and internal self-organizing factors (Benbya & McKelvey, 2006; Teisman & Klijn, 2008). This feature echoes the configurational approach and its emphasis on complex set-theoretic connections and combinations of causal conditions (Ragin, 2008). In addition, to better construct this framework, this study further incorporates diffusion of innovation theory (Berry & Berry, 2007; Rogers, 2003) and contingency theory (Betts, 2003; Eschenfelder, 2004; McGrandle, 2017) to hypothesize the effects from each factor. The central question of this research is *How can demand- and supply-based factors be used to explain the variations of open government implementation for public organizations?*

This study examines the potential combinations of factors influencing open government implementations using the techniques of fuzzy set qualitative comparative analysis (fsQCA), with a special emphasis on the context of New Jersey’s local school districts. Combining the advantages of both quantitative and qualitative approaches, fsQCA is featured by its focuses “on the complex and asymmetric relations between
outcome of interest and its antecedents” (Pappas & Woodside, 2021: 3), which fits with the research question and theoretical framework of this paper. In addition, the rationale for focusing on the context of school districts is mainly based on the fact that school districts have been highly involved in the ecosystem of open government. At federal level, the open data portal operated by the Department of Education under open government initiatives requires data sharing from American school districts. At state level, the related open government regulations—for example, the Open Public Meeting Act (N.J.S.A. 10:4) in New Jersey—also require school districts to release the minute/agenda for each meeting of the Board of Education. The importance of implementing open government can be better observed in the context of the pandemic, while parents and school administrative teams both rely on open government mediums (e.g., the COVID-19 dashboard) to communicate virtually or to disseminate policy guidance. From the perspective of methodology, the included school districts, which are located in Essex and Union County, are considered comparable because they not only share similar legal institutional features but also show distinct variations on both potential factors and outcomes (Ragin, 2008).

Finally, the research findings of fsQCA show the existence of multiple equally-effective configurations of factors associated with greater accessibility, transparency, and participation of open government implementation. More specifically, while each dimension of open government is subject to different configurations of factors, the supply-based factors, such as organizational capacity and administrative professionalism, are consistently effective in the aspects of transparency and participation. Such a phenomenon might be explained by noting that the related implementation for these two aspects might require higher-level organizational digital capacity or slack of resources. On the contrary,
the effects of demand-based factors, which are operationalized as the complexity of contextual environment, are only apparent for the aspect of accessibility. Namely, to involve more citizens, the implementation of accessibility (e.g., providing translated documents for non-English speakers) is highly influenced by a community’s racial diversity.

The remainder of the present research is organized as follows. The second section reviews the related literature and theoretical basis of supply- and demand- based factors in order to construct the integrative theoretical framework that draws on complexity theory and configurational approach. The third methodological section introduces the processes of data collection, measurement, and techniques of fsQCA. The fourth section presents the related empirical evidence of fsQCA, followed by the final section describing the related theoretical and practical implications.
2. Conceptual Model and Research Propositions

This section aims to specify the research propositions drawn from the integrative theoretical framework. In doing so, it starts by introducing the two primary groups of factors (supply- and demand-based factors) that lead to open government implementation in the literature. More importantly, this section not only explains why including two groups of factors is essential but also demonstrates how an integrative theoretical framework can be built based on complexity theory and configurational approach.

2.1 Supply-based theoretical basis and literature

Mainly focusing on organizational capacities, the supply-based factors address why the organization is capable of implementing a specific public service. These capacities may entail the slack resources (both physical and human resources), the experiences or skills to manipulate technologies, or the institutional settings facilitating policy implementations. Within the literature of e-government, the supply-based analysis has long been dominant for the related studies examining the adoption, diffusion, or benchmarking of digital services (Rana, Dwivedi, & Williams, 2013; Zhao et al., 2018).

Among the theories employed to examine e-government or open government adoption/implementation, diffusion of innovation (DOI) theory (Berry & Berry, 2007; Jun & Weare, 2010; Raus, Flügge, & Boutellier, 2009; Rogers, 1983) and the technology-organization-environment (TOE) framework (Chen, Kang, & Luna-Reyes, 2019; DePietro, Wiarda, & Fleischer, 1990; Wang & Lo, 2016) are two primary theoretical frameworks that include supply-based factors. More importantly, both DOI theory and the TOE framework center on organizations’ internal settings, which further lays the foundation for discussing supply-based factors and examining why public organizations at the meso level
are capable of adopting open government (e.g., Grimmelikhuijsen & Feeney, 2016). The basic assumption of DOI theory contends that an innovation is diffused/adopted through certain channels among the members of a social system because of internal determinants (Rogers, 1983). The research of internal determinants mainly focuses on the organizational features inside the organization (e.g., the availability of resource; Mohr, 1969). The TOE framework sheds further light on technical factors and argues that the related features of adopted technologies or organizations’ technology skills also impact the implementation process (Zhang et al., 2017; Wang & Lo, 2016).

Within the literature of empirical studies, there are several frequently-examined supply-based factors leading to open government implementation, including organizational capacity, organizational resource, and administrative professionalism. The concept of organizational capacity can be referred to “the degree to which a government agency possesses in terms of the required ability and expertise” (Yang & Wu, 2016: 382). As with the TOE framework or DOI theory, the implementation of new technologies requires public organization to have adequate skill sets to manipulate the proposed technologies, to redesign the delivery process of public services, and to evaluate the potential impacts. It is believed that having greater organizational capacity means being able to demonstrate better creativity or being able to deal with potential risks during implementation. Empirically, organizational capacity has been found to be positively associated with the online adoption of open government in 500 local governments (Grimmelikhuijsen & Feeney, 2016) or with public agencies’ intention to publish open government data (Yang & Wu, 2016).

The second factor is whether public organizations have sufficient fiscal resources to support the long-term implementation of open government. Under the TOE framework
or from the perspective of DOI theory, the availability of *organizational resource* is an essential element for organizations to consider whether certain technological innovation is affordable. The significance of fiscal resource has been repeatedly included in the literature of e-government (Ahn, 2016; Fountain, 2004; Ma, 2014; Styles & Tennyson, 2007) or open government studies (Bearfield & Bowman, 2016; Harrison & Sayogo, 2014; Zhan & Fan, 2018). In the 2017 Government Technology Solution Survey conducted by the International City/County Management Association, over 75% of surveyed US local governments identify the lack of financial resources as the first obstacle of e-government implementation (ICMA, 2017).

The final supply-based factor is *administrative professionalism*, especially from the perspective of managers. Administrative professionalism can be understood as the “development of values in pre-service training and in-service socialization as well as efforts to influence personnel policy and public policy within the sphere of the public employees’ competence and authority” (Rosenbloom, 1984: 52). In the literature on DOI theory or the TOE framework, administrative professionalism is usually considered one type of organizational resource that positively affects the implementation of ICT-oriented innovations (Carrizales, 2008; Grimmelikhuijsen and Feeney, 2016; Moon & Norris, 2005; Prybutok, Zhang, & Ryan, 2008; Reddick & frank, 2007; Sterib & Navarro, 2008). Prior studies tend to assume that managers with professional training/network are “more cognizant of, and potentially more committed to, managerial best practices and therefore more likely to create the supportive administrative culture” (Bearfield & Bowman, 2016: 5).
2.2 Demand-based theoretical basis and literature

Besides the supply-based approach, another important approach used to examine the development of open government is from the demand perspective, which can be referred to as “public views of, and interactions with, government via electronic channels” (Gauld, Goldfinch, & Horsburgh, 2010) regarding government openness. Instead of a technological or organizational focus, this demand-based approach mainly centers on the point of view of individuals and examines whether the presented digital services are designed/provided based on the government’s perception of public needs or whether the real usage/interaction meets the initial expectations (Reddick, 2005). The demand-based approach basically assumes that individuals will not employ a new technology until acknowledging its benefits (Fountain, 2001); similarly, the public sector will not implement a new technology if public managers fail to perceive citizens’ needs.

The primary theory to include demand-based factors is contingency theory. The concept of contingency theory is origin from the field of business administration or organizational behavior research. Focusing on the demands of environment, researchers argue that “[organizations’] best way to organize depends on the nature of the environment to which the organization must relate” (Scott, 1992: 89). Thus, as organizations encounter unpredictability or uncertainty caused by environmental changes, organizations tend to modify the organizational structure or apply new technologies to maintain a good fit between organizations and the environment and to manage contingency (Betts, 2003; Eschenfelder, 2004; McGrandle, 2017; Weber, Otto, & Österle, 2009; Weill & Olson, 1989).
Accordingly, one of the primary factors included in contingency theory to influence the development of government transparency and information dissemination is the *environmental diversity*. The concept of diversity can be understood as “the collective (all-inclusive) mixture of human differences and similarities along a given dimension” (Wise & Tschirhart, 2000: 387). Researchers of contingency theory contend that the greater diversity of environment will force organizations to adopt new technologies to better communicate with the related stakeholders in the changing environment in order to produce the desired outcome (Jun & Weare, 2011; Galbraith, 1977). Among the related empirical studies examining the development of e-government, researchers of e-government tend to assume that bigger local jurisdictions are more likely to be innovative, “possibly because they face a more diverse environment that always demands innovative solutions” (Ho, 2002: 439). More recently, the concept of environmental diversity has been operationalized economically or racially. For example, in their study focusing on the American municipalities from 1994 to 2003, Jun and Weare (2011) found that the adoption of e-government innovation is significantly associated with environmental diversity that is operationalized as the heterogeneity of industry composition.

### 2.3 Integrative theoretical framework and research propositions

Many empirical studies within the field of open government or e-government have repeatedly argued the importance of simultaneously addressing both supply- and demand-based factors to analyze the adoption/implementation of new ICTs (Dawes, Vidiasove, & Parkhimovich, 2016; de Kool & Bekkers, 2015; Ganapati & Reddick, 2012; Gauld, Goldfinch, & Horsburgh, 2010; Heeks, & Bailur, 2007; Ohemeng & Ofosu-Adarkwa, 2015; Reddick, 2005; Yang & Wu, 2016). Unfortunately, while there is a wealth of
empirical research on supply-based determinants, there is little empirical research on demand-based determinants. The aforementioned framework of TOE and DOI theory mainly concentrate on an organization’s internal features/settings but fail to include the impacts of citizen demand or contextual factors. Considering that citizens are usually the end users of adopted open government technologies, who are also expected to actively join the collaborative governing structure, neglecting citizens’ input may not only affect the research validity, but it may also fail to generate policy implications. More specifically, this study does not deprecate the significance of supply-based analysis but simply argues that an integrative theoretical framework is needed.

Accordingly, this study employs complexity theory to construct an integrative theoretical framework covering the aforementioned supply- and demand-based factors and enabling configural analyses. Complexity theory contravenes the traditional governing structure of Weberian bureaucracy and attempts to conceptualize government and governing process by understanding “change and the dynamics of systems as a result of the complex interaction of the parts of those systems” (Klijn, 2008: 300). Namely, the governing process, or the open government implementation in this study, is not simply the sum of the parts; instead, it should be subject to diverse feedback mechanisms and should consist of the interactions of a series of factors/agents with a nonlinear format (Cairney, 2012; Grobman, 2006; Klijn, 2008; Meek, 2010; Teisman & Klijn, 2008). Following the principle of equifinality (Woodside, 2014), complexity theory further contends that examining the dynamic among multiple factors within the context is more important because the interested outcome “can equally be explained by alternative sets of causal
conditions that combine in sufficient configurations for the outcome” (Pappas et al., 2016: 796).

The concept of complexity theory is believed to adequately fit with the context of open government. As mentioned in the prior chapter, at the macro level, open government initiatives attempt to form a new collaborative governing structure involving diverse actors from the public and private sector, which echoes the key principle of complexity theory, emphasizing interactions and feedback mechanisms among these actors. More specifically, at the meso level, the implementation of open government initiatives not only entails whether public organizations can afford/support the adoption of new ICTs but also requires public organizations to consider the continuous adaptations based on the demands of citizens/users. The dynamics regarding how these two primary groups of factors interact with each other not only represents the non-linear relationship among these factors but also implies the existence of various types of implementations. Especially, while lacking a top-down or unified guidance of implementation (Yu & Robinson, 2012), the dynamics of these supply- and demand-based factors may be difficult to predict, and different combinations/configurations of factors may eventually lead to the same outcome. The first proposition of this study is thus as follows:

**Proposition 1.** There are multiple configurations of supply- and demand-based factors leading to the implementation of open government instead of a single best configuration or a single independent variable.

The second proposition of this study centers on the potential variations of configuration associated with different aspects of open government implementation. According to the systematic review in the prior chapter, the process from conceptualization
to implementation of open government can be broadly divided into different aspects, such as transparency, participation, and collaboration. Given that each aspect entails different administrative procedures, requires different resources, and involves different stakeholders, it can also anticipate that the dynamics/configurations of supply- and demand-based factors will vary correspondingly. The second proposition is hence as follows:

**Proposition 2.** Different aspects of open government implementation may require disparate configurations of supply- and demand-based factors.

3. Methodology, Cases, Data, and Measurement

3.1 Methodology: fsQCA

Based on the research questions and theoretical framework of complexity theory, the key technique used to examine the above propositions is fsQCA (Ragin, 2008). This is a technique of data analysis that supports configurational examinations and is widely utilized by researchers from different disciplines, including public administration (e.g., Andrews, Beynon, & McDermott, 2016; Ingrams, 2017). Combining the features of a case-oriented approach and a variable-oriented approach, the basic function of fsQCA is to analyze causal relationships through a series of comparisons supported by Boolean algorithms (Ragin, 1987; Rihoux, 2006). The basic assumption of fsQCA is that the results are caused by a combination of different factors instead of a single factor; thus, one result can be caused by different combinations of factors (Berg-Schlosser et al., 2009; Ragin, 1987). These special assumptions specifically echo the central principles of complexity theory. In addition, the operation of the fsQCA approach can have several strengths (Berg-
Schlosser et al., 2009; Ragin, 1987; Rihoux, 2006), including allowing a “small-N” analysis of causality and facilitating the process of theory building and revision.

In this study, the fsQCA approach is applied as it is believed that it will aid with answering the research questions based on the following considerations. First, compared with other types of qualitative comparative analysis (QCA) techniques (e.g., crisp-set QCA), fsQCA enables the researcher to “calibrate partial membership in sets using values in the interval between 0 (non-membership) and 1 (full membership)” (Ragin, 2009), which meets the requirements of measuring a variety of types of open government implementation in this research. Second, to fill the research gap of prior empirical studies, which have tended to identify the universal factor across all cases, this study analyzes the patterns of successful combinations of determinants. This approach also provides more meaningful policy implications for districts with fewer resources. Finally, the strength of theory building can be used to cope with the reality of a lack of theory in the field of e-government and open government research (Bannister & Connolly, 2015).

3.2 Cases: 41 school districts in northern New Jersey

To better address the research questions and propositions, this study focused on 41 school districts within Union County and Essex County, New Jersey. The most important consideration is that the implementations of open government at the most grassroots level of public organizations is highly connected with citizens’ daily life. This connection can be observed when the school districts not only follow the Open Government Plan of federal agencies (e.g., the Department of Education) to provide related data and promote

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14 This study excludes vocational school districts because (1) the student population of these districts have less connection with the local context and (2) the required transparency and participation mechanisms are different from ordinary school districts.
collaboration but also when they adhere to state government’s Open Public Meeting Act (e.g., New Jersey and Tennessee) to release information pertaining to meeting agendas and minutes to assure accessibility and promote public participation.\(^{15}\) This connection may be more apparent during the COVID-19 pandemic given that school districts rely on ICTs or open government mechanisms to communicate or make decisions with local educators and parents (Rehm et al., 2021; Shrubb & Jacques, 2020). More importantly, apart from the fact that the number of cases in these regions is appropriate for the fsQCA approach, these school districts share a similar institutional background and geographical context while also demonstrating tremendous variation in social demographic composition and in the implementation of open government initiatives; such variation is an essential element of case selection in QCA research (Cress & Snow, 2000; Ragin, 1987).

In addition, the benefits of focusing on a local educational context are threefold. First, research regarding the implementations of open government initiatives at the school district level is missing from open government research. A focus on the context of local school districts is expected to complement current studies’ disproportionate emphasis on cases of the federal government. Second, compared with the context of the federal government, a focus on local school districts can largely limit the related actors, simplify the process of theory building, and strengthen the analysis model that consists of both internal and contextual factors. Finally, considering that local educational affairs are usually connected to individuals’ life experiences, this focus can prevent the unnecessary

\(^{15}\) In some areas—for instance Washington, Texas, and Kansas State—the elected officials of school districts are even required to receive open government-related training, which is usually delivered by the Association of School Boards or the state’s attorney general, while taking the oath of office. The rationale behind this training is the perception that the elected school boards of school districts should be accountable to the public when receiving public funding.
bias caused by a lack of either common experience or basic understanding when investigating the potential psychological impacts of accessing local open government services.

3.3 Data and measurement

The examination of fsQCA in this study includes three primary data sources: the performance report of each school from academic year (AY) 2017 to AY 2019, observational data derived from the content analysis of each school district’s official website, and the open access data provided by the New Jersey Department of Education (NJDOE). The performance report of each school district is published annually by the NJDOE to provide essential information for district leaders, local educators, parents, and community members. The provided information entails a variety of aspects regarding each school district’s development and performance, such as student and staff demographics, statewide assessment results, student graduation, district environment, and supporting qualitative narrative. The final performance report is provided based on the mandatorily submitted data from each school district and the assessment/exam data (e.g., SAT scores) provided by the outside vendor. The selected performance reports are published from AY 2017 to AY 2019. The main reason the version\textsuperscript{16} of AY 2020 is not included is because a variety of indicators were unavailable during the pandemic.

A content analysis was conducted for 41 selected school districts’ official websites to measure their open government implementation. Focusing on a public agency’s website

\textsuperscript{16}The latest version of the performance reports (AY 2020) was released in April 2021. Within this version, the related data elements regarding student growth and student academic achievement are not available. Some other data elements, such as college and career readiness, dropout rate, or graduate rate, are only partially available.
to analyze the implementation of open government initiatives is a common research approach (e.g., Bearfield & Bowman, 2016; Grimmelikhuijsen & Feeney, 2016; Yavuz & Welch, 2014). The basic assumption of this operation is that the official website is considered to be the platform for information stewardship and civic involvement (Chatfield & Reddick, 2018). Accordingly, all official websites were analyzed and coded by the author, following the protocol that includes 37 indicators (as shown in Table 11). A preliminary coding process was initiated in February 2021 to test the validity of the proposed protocol. The formal coding process was started in late February and completed by the end of March 2021.

The last data source of this study is the district-wide User Friendly Budget, published by the Office of School Finance of NJDOE. This User Friendly Budget is an open access data and will be updated annually. Compared with the traditional budget format, User Friendly Budget is published based on the regulation of N.J.S.A 18A to summarize primary fiscal information (e.g., revenues by major category or the school tax rate) in plain language. For research purposes, the related fiscal data was pulled out from the reports of User Friendly Budget (from AY 2017 to 2019) that were disseminated on the official website of NJDOE.

The following two sections respectively explain the measures of outcome and hypothesized factors. The definitions/conceptualizations of these hypothesized factors have been reviewed in sections 2.1 and 2.2 along with the corresponding theories. Following the principles of fsQCA, each measured value was further calibrated based on the related literature or the variation of data and ranging from 0 to 1 (Chen & Chang, 2020; Douglas & Meijer, 2016; Ragin, 2008; Pappas et al., 2016). More specifically, the original
interval-based data was transformed to fuzzy membership score, in which the value of “1” represents the full set membership and the value of “0” stands for full non-membership (Ragin, 2009). The calibration of values was conducted by following Ragin (2000: 156) to transform each value to a five-value fuzzy set. The related thresholds regarding full membership, the crossover point, and full non-membership were reported along with the operationalization of each factor in the following sections.

3.3.1 Outcome (dependent variable)

*Open government implementation.* The primary dependent variable of this research, namely, the implementation of open government initiatives, was measured through the content analysis of school districts’ websites. As mentioned in the prior chapter, at macro level, open government is usually conceptualized by covering three principles: transparency, participation, and collaboration (Ganapati and Reddick, 2014; Wirtz and Brikmeyer. 2015). However, considering that the scale of school districts may be too small to start a project through the mechanism of civic collaboration (e.g., e-sourcing), the measurement structure of this study is derived from the study of Grimmelikhuijsen and Feeney (2016), which uses the concept of accessibility to replace civic collaboration.

The measurement protocol (as shown in Table 10) includes the examination of 37 indicators covering the aspects of accessibility, transparency, and participation. The accessibility aspect (four indicators) measures whether the website supports users to better navigate the provided information, such as providing multi-lingual access for non-English speakers and specific functions to search for preferred information. The transparency aspect aims to measure the extent to which essential information regarding school district operation is disseminated online. This study reviewed all of the regulations of NJDOE
entailing disseminating information online and the related practices during the pandemic to list 20 indicators, including required administrative information, board of education information, and COVID-19 information. The participation aspect examines whether the essential information or mechanisms is provided to facilitate greater public participation on local educational affairs. Accordingly, 13 binary indicators were included in this aspect, covering the issues of providing board meeting information, social media use, and contact information of the administrative team. Finally, the sum score for each school district was calculated based on 37 indicators (each indicator is worth 1 point). The average score for each school district is 21.46 points, with a stand deviation of 4.35 points. In respect to the calibration process, this study sets the thresholds of full membership at 28 points, crossover point at 20 points, and non-membership at 17 points. To better measure the implementation, some indicators (e.g., User Friendly Budget) require the presence of specific information for at least 5 years in order to obtain a full point. However, it should be noted that the proposed codes can only generally indicate the presence of certain services or information instead of examining the corresponding quality or the real usage of citizens. For example, the related indicators of participation, which are derived from Grimmelikhuijsen and Feeney (2016), mainly measure the availability of required information and mediums for online participation but not the extent/quality of public participation.
### Table 10. The measure of open government implementation

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
<th>Indicators of operationalization (Total=37)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Accessibility</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Language</td>
<td>Whether the website provides multi-lingual access for non-English speakers</td>
<td>Language translation (1=Y; 0=N)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Translated documents (1=Y; 0=N)</td>
</tr>
<tr>
<td>Website directory</td>
<td>Whether the website provides technical support to search preferred information</td>
<td>Search bar (1=Y; 0=N)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Website directory (1=Y; 0=N)</td>
</tr>
<tr>
<td><strong>Transparency</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Required administrative information</td>
<td>Whether the required information is regularly released on the website</td>
<td>Anti-bullying information (an independent page) (1=Y; 0=N)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>District policies/regulations (1=Y; 0=N)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Alcohol or drug abuse (1=Y; 0=N)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Water quality/testing information (1=Y; 0=N)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>School performance report (file/link) (1=Y; 0=N)</td>
</tr>
<tr>
<td>Board of education information</td>
<td>Whether the essential information of the board is provided</td>
<td>Board member introduction (0=N; 0.5=names; 1=name &amp; introduction)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Minutes (0=N; 0.33=1 year; 0.66=3 years; 1=5 years)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Video (0=N; 0.33=1 year; 0.66=3 years; 1=5 years)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Newsletter or key announcement (0=N; 1=Y)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Meeting or presentation materials (0=N; 1=Y)</td>
</tr>
<tr>
<td>District budget</td>
<td>Whether the essential information of broad meeting is provided with a user-friendly or accessible format</td>
<td>Conventional budget document (0=N; 0.33=1 year; 0.66=3 years; 1=5 years)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>User Friendly Budget (0=N; 0.33=1 year; 0.66=3 years; 1=5 years)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Audit report (0=N; 0.33=1 year; 0.66=3 years; 1=5 years)</td>
</tr>
<tr>
<td>COVID-19 information</td>
<td>Whether the district provides the updated information and related policies/responses</td>
<td>Restart/Return to school plan (1=Y; 0=N)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>COVID updated cases/dashboard (1=Y; 0=N)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>COVID general information (e.g., testing, prevention, etc.) (1=Y; 0=N)</td>
</tr>
<tr>
<td>Department description</td>
<td>Whether the district provides the description of each department, board member, or primary administrative staff</td>
<td>Administrative department information/introduction (1=Y; 0=N)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Administrative staff (0=N; 0.5=names; 1=name and introduction)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Activity news of the district (1=Y; 0=N)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Superintendent introduction (0=N; 0.5=names; 1=name and introduction)</td>
</tr>
<tr>
<td><strong>Participation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contact information</td>
<td>Whether the contact information of Board of Education members and/or administrative staff is provided</td>
<td>Contact information of superintendent (email, phone, address)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Contact information of staff (email, phone, address)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Contact information of board members (email, phone, address)</td>
</tr>
<tr>
<td>Social media use</td>
<td>Whether the mediums of social media have been used meaningfully</td>
<td>Facebook account (1=Y; 0=N)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Twitter account (1=Y; 0=N)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Other social media accounts (IG, Youtube, etc.) (1=Y; 0=N)</td>
</tr>
<tr>
<td>Voting information</td>
<td>Whether the information of voting and/or election is provided</td>
<td>General election information (1=Y; 0=N)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Referendum information (1=Y; 0=N)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Election registration form (1=Y; 0=N)</td>
</tr>
<tr>
<td>Board meeting participation</td>
<td>Whether the mechanism of participation is demonstrated</td>
<td>Opinion input—Board (e.g., meeting proposal) (1=Y; 0=N)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Agenda (0=N; 0.33=1 year; 0.66=3 years; 1=5 years)</td>
</tr>
<tr>
<td>Online forum</td>
<td>Whether the discussion board of online opinion board is provided</td>
<td>Discussion board (1=Y; 0=N)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Opinion input—District (1=Y; 0=N)</td>
</tr>
</tbody>
</table>
3.3.2 Hypothesized causal factors

*Organizational capacity.* The student population of each school district serves as the final measure of organizational capacity, based on the operationalization practices in the literature (Ma, 2014; Grimmelikhuijsen & Feeney, 2016; Yang & Rho, 2007). While lacking a direct proxy to measure each school district’s organizational capacity from multiple angles, focusing on the size of student population could be an efficient way to do this, considering that the related literature has indicated the positive relationship between population and e-government capacity of local public organizations (Moon, 2002; Yang & Rho, 2007). Accordingly, this study calculated the average student population from AY 2017 to AY 2019 using the data from each school district’s annual performance report published by NJDOE. This study found that the size of the student population of the selected 41 school districts ranges from 133 to 41,163 students, with a standard deviation of 7,331 students (mean=5,291 students). Based on the practices of the National Center for Education Statistics, student population was further calibrated with the thresholds of full membership at 10,000 students, non-membership at 1,000 students, and crossover point at 2,500 students.

*Organizational resource.* Considering the importance of fiscal resources indicated in academic research (Ahn, 2016; Fountain, 2004) and practical surveys (ICMA, 2017), this study measured each school district’s organizational resources using the data of total general current expense, which indicates the scale of district budgets and available fiscal resources. The data was taken from the annual school district performance report published by NJDOE and calculated by averaging the total general current expense from AY 2017 to AY 2019. Accordingly, the expense scale of each school district varies from $3,428,230 to
$358,190,012, with a mean of $69,825,513 and standard deviation of $64,340,495. This data was calibrated by the following thresholds: the full membership at $120,000,000, crossover point at $55,000,000, and non-membership at $35,000,000.

*Administrative professionalism.* Following Bearfield and Bowman (2016) and Berman (1999), this study operationalized the concept of administrative professionalism by measuring whether the superintendent of each school district has a doctoral degree. It is anticipated that receiving more credentialed education can help top managers of school districts to be better aware of the necessity of open government initiatives, participate in professional networks, propose implementation strategies, or have greater commitment (Bearfield & Bowman, 2016; Dawes, 2004). The data of superintendent’s education attainment was retrieved from the list of contact information provided by NJDOE and was confirmed while conducting the content analysis on each school district’s website. Twenty-two out of 41 school districts (54%) hired a superintendent with a doctoral degree.

*Environmental diversity.* This study centers on the issue of ethnicity to operationalize the concept of environment diversity, following Ahn (2011) and Huang (2007). More specifically, this study respectively measured the extent of racial diversity for two primary user groups of open government websites—teachers and students/parents of each school district. Following the related literature of public administration to measure the percentage of the nonwhite population as the proxy of diversity (Lopez-Littleton & Blessett, 2015; Pitts, 2009; Stone, Hager, & Griffin, 2001), the means of *nonwhite student percentage* and *nonwhite teacher percentage* were respectively retrieved from the school district’s annual performance reports from AY 2017 to AY 2019. With regard to the percentage of the non-White student population, an average of 3 academic years can vary
from 11% to 99% among the 41 school districts (Mean=50%; SD=31%). In addition, the average nonwhite teacher population of 3 academic years among these 41 school districts also varies from 1% to 71% (Mean=18%; SD=20%). Due to the different distribution patterns of *nonwhite teacher percentage* and *nonwhite student percentage*, these two variables are calibrated based on different thresholds. For nonwhite teachers, the threshold of full membership is 60%, followed by the crossover point at 15%, and the non-membership threshold at 5%; with respect to nonwhite students, the threshold of full membership is 80%, along with the crossover point at 40%, and the non-membership threshold at 20%. To better demonstrate the measures of the outcome of interest and hypothesized factors, the related information of descriptive statistics and correlation matrix is presented in Table 11.

**Table 11. Descriptive statistics and correlation matrix**

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>SD</th>
<th>Max</th>
<th>Min</th>
<th>N</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Open government</td>
<td>21.46</td>
<td>4.35</td>
<td>30.5</td>
<td>15.49</td>
<td>41</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>implementation</td>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Organizational</td>
<td>5,291</td>
<td>7,331</td>
<td>41,163</td>
<td>133</td>
<td>41</td>
<td>.546**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>capacity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Organizational</td>
<td>$69,826</td>
<td>$64,340</td>
<td>$358,190</td>
<td>$3,428</td>
<td>41</td>
<td>.613**</td>
<td>.874**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>resource (thousand)</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Administrative</td>
<td>.54</td>
<td>.50</td>
<td>1</td>
<td>0</td>
<td>41</td>
<td>.409**</td>
<td>.299</td>
<td>.323*</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>professionalism</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Environmental</td>
<td>50%</td>
<td>31%</td>
<td>11%</td>
<td>99%</td>
<td>41</td>
<td>.231</td>
<td>.619**</td>
<td>.467**</td>
<td>.052</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>diversity (students)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Environmental</td>
<td>18%</td>
<td>20%</td>
<td>1%</td>
<td>71%</td>
<td>41</td>
<td>.170</td>
<td>.664**</td>
<td>.472**</td>
<td>.172</td>
<td>.803**</td>
<td>1</td>
</tr>
<tr>
<td>diversity (teachers)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Pearson correlation coefficients

*p<.05; **p<.01.
4. Results of fsQCA Analysis

This section aims to show the findings of configurational analysis derived from multiple fsQCA models. Based on the conceptualization and operationalization of open government, these models include different interests of outcome—overall implementation of open government, accessibility, transparency, and participation—and an identical set of hypothesized causal factors. During the calculation of fuzzy set algorithm using the fsQCA 3.0 software, the total $2^5$ rows of possible configuration were produced and then cleared up to remove unnecessary and inconsistent conditions with three thresholds: (1) the raw consistency is lower than 0.8, (2) the width number is lower than 1, and (3) the value of proportional reduction inconsistency is below 0.5 (Chen & Chang, 2020; Greckhamer et al., 2018; Pappas & Woodside, 2021; Ragin, 2008).

The related results of fsQCA analyses were demonstrated as Table 12. Following the suggestions of Pappas and Woodside (2021), the results in Table 13 were based on parsimonious solution and intermediate solution, in which the former represents certain factors that are considered the most important and that cannot be ignored in any solution, and the latter mainly includes theoretically plausible counterfactuals. Table 3 mainly presents two types of information. First, the presence (or absence) of each factor is clearly marked. The bigger black spot (●) represents the presence of a core condition marked in parsimonious solutions, while the smaller black spot (●) denotes the presence of a peripheral condition shown in ordinary intermediate solutions. Conversely, the bigger crossed-out circle (⨂) indicates the negation or absence of a core condition, and the smaller one denotes the negation or absence of a peripheral condition. A blank column simply indicates a “do not care condition”, and the presence of certain factors can be ignored. Second, the values
of consistency and coverage of each combination of factors are also presented in the table. The value of consistency can be understood as the “degree to which the cases sharing a given combination of conditions agree in displaying the outcome” (Ragin, 2008: 44). In contrast, the meaning of coverage is similar with the R-square in regression analysis and can be referred to as the degree to which “a causal combination accounts for instances of an outcome” (Ragin, 2008: 44). The related interpretations of fsQCA analyses are introduced in the following sub-sections.

Table 12. fsQCA findings

<table>
<thead>
<tr>
<th>Factors</th>
<th>Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DV=Total</td>
</tr>
<tr>
<td>Supply-based</td>
<td></td>
</tr>
<tr>
<td>Org. capacity</td>
<td></td>
</tr>
<tr>
<td>Org. resource</td>
<td></td>
</tr>
<tr>
<td>Admin. professionalism</td>
<td></td>
</tr>
<tr>
<td>Demand-based</td>
<td></td>
</tr>
<tr>
<td>Diversity (students)</td>
<td></td>
</tr>
<tr>
<td>Diversity (teachers)</td>
<td></td>
</tr>
<tr>
<td>Consistency</td>
<td>.875</td>
</tr>
<tr>
<td>Raw coverage</td>
<td>.28</td>
</tr>
<tr>
<td>Unique coverage</td>
<td>.28</td>
</tr>
<tr>
<td>Overall consistency</td>
<td>.877</td>
</tr>
<tr>
<td>Overall coverage</td>
<td>.585</td>
</tr>
</tbody>
</table>

Note: (1) ● = the presence of a core condition; (2) * = the presence of a peripheral condition; (3) ⊗ = the negation or absence of a core condition; (4) ⊗ = the negation or absence of a peripheral condition; (5) Blank space = “do not care condition”
4.1 The model of overall implementation

The first part of Table 13 shows two possible combinations of hypothesized factors, either presence or absence for each factor, within the fsQCA analysis while setting the overall implementation as the outcome of interest. The first solution shows that the combination of organizational capacity, organizational resources, and administrative professionalism, along with absence or negation of student and teacher diversity, are associated with the greater performance of open government implementation. This consistency score of this solution is .875, which indicates that when selected cases have higher organizational capacity, organizational resource, and administrative professionalism, around 87.5% of them will have a greater score of open government implementation. In contrast, the second solution shows a different path heading to the same outcome. Solution 2 indicates that the school districts without a credentialed superintendent and teacher diversity can still attain a high level of open government implementation while having greater organizational capacity, organizational resource, and student diversity. The other finding derived from this solution is that the student diversity, which is operationalized as the percentage of non-White students, can contribute to the implementation of open government initiatives. Although the impact of teacher diversity is not confirmed in these two solutions, the result of student diversity only partially confirms the contingency theory. However, it should be noted that the importance of the supply-based factors is more apparent than the importance of the two demand-based factors, considering the presence of factors in both solution 1 and 2.
Moreover, the existence of two combinations not only illustrates that different configurations of factors will be associated with the same outcome—a higher level of open government implementation—but also echoes the first proposition of this study. To better describe the sufficiency of these two solutions, this study, following Ragin (2008) and Ingrams (2018), respectively depicts two XY plots (as shown in Figure 7), demonstrating the distribution of these selected 41 school districts. Based on Figure 7, it can be seen that the observations are located on or above the main diagonal of each figure (with the consistency scores of .875 and .92 respectively), which denotes that these two causal combinations of factors are “almost always” sufficient for the implementation of open government. In general, the overall coverage of these two solutions is .585, which also
indicates that a substantial proportion of the outcome can be explained by these two different combinations of factors.

4.2 The model of accessibility

Besides the model of overall implementation, this study further examines different potential combinations of factors while setting each principle as the dependent variable. The results of further fsQCA analyses, which are demonstrated as solution 3 to 9, demonstrate a distinctive path to explain the implementation of open government. In respect to solution 3, which has the highest coverage score, the combination of organizational capacity, organizational resource, administrative professionalism, and student diversity can be associated with greater open government implementation, regardless of the level of teacher diversity. Solution 5 is the other combination involving demand-based factors. In other words, the configuration of both teacher and student diversity, along with the presence of organizational capacity and administrative professionalism and the negation of organizational resource, is associated with greater accessibility, while the consistency score is as high as 1. Namely, for the school districts without abundant resources, greater accessibility can still be achieved if the factors of organizational capacity, administrative professionalism, and teacher and student diversity are present. The most concise path, solution, associated with greater accessibility, only requires the presence of one factor—administrative professionalism. In other words, some school districts can have a credentialed superintendent as well as an accessible online medium, although they might fail to have adequate organizational resources and capacity and lack demands from teachers and students.
Holistically reviewing three solutions that are associated with greater accessibility, the dynamics of three combinations is apparently different from the prior model of overall implementation. While the supply-based factors are still the primary constructs (solution 3 and 5), the contribution of two demand-based factors is confirmed. In other words, the extent of accessibility (e.g., the multi-language setting) is directly affected by the demands of website users—teachers and students. In addition, unlike solutions 1 and 2, which rely on organizational resource and capacity, solution 4 shows the possibility of achieving greater accessibility only with a credentialed superintendent (consistency score=.833; coverage score=.159). The XY plots of these three solutions are depicted in the Appendix 2.

4.3 The model of transparency

The results from the model of transparency are once again different from the dynamics in the accessibility model. This model includes two combinations of factors. In solution 6, the presence of organizational capacity, resources, and student diversity, along with the absence of administrative professionalism is associated with greater transparency (consistency score=.789; coverage score=.181). The other combination, solution 7, also shows similar dynamics. In other words, solution 7 demonstrates that having three supply-based factors, with the absence of two other demand-based factors, contributes to a more transparent environment (consistency score=.917; coverage score=.265). As these two solutions demonstrate, supply-based factors once again become the core constructs of two combinations, although the presence of student diversity is shown in solution 6 as a peripheral factor. To better depict the sufficiency of these two solutions, the XY plot is presented in the Appendix 2.
4.4 The model of participation

The last model of the fsQCA analysis displays the importance of organizational resource to support public participation in school districts, which is not found in prior models. Following Pappas and Woodside (2021), this study clearly marks the presence of a core condition as a big spot based on the results of parsimonious solution shown by fsQCA 3.0. In solution 8 (consistency score=.789; coverage score=.169), organizational resource is the stronger factor associated with greater participatory settings on each school district’s website, along with the presence of organizational capacity and student diversity, regardless of the level of teacher diversity. In solution 9, with a higher consistency score (.958) and coverage score (.258), organizational resource is the primary construct among three sufficient supply-based factors, with the negation of two other demand-based factors. Namely, three supply-based factors are the primary construct of this solution for school districts to either release more information or provide more mediums regarding public participation in local educational affairs.

To sum up, the dynamics of these nine combinations of hypothesized factors across four different models illustrates the following features. First, it can be found that these nine solutions respectively include different combinations of factors that are either present or negative or either core or peripheral, while setting different dependent variables. These kinds of variation denote that distinctive combinations of factors may be associated with a similar outcome (Proposition 1). Moreover, these variations also indicate that each principle of open government (i.e., accessibility) may require different combinations of factors (Proposition 2). More specifically, it has been found that the sufficient factors for the model of accessibility are apparently different from others. This phenomenon can be
further confirmed when the models of overall implementation, transparency and participation all share a similar solution that cannot be found in the accessibility model: the combination includes the presence of all three supply-based factors but the negation of the two demand-based factors (solution 1, 7, and 9). Second, the dynamics of these nine solutions also illustrate that the importance of three supply-based factors might be more apparent than the demand-based counterparts, except in the model of accessibility. In other words, the presence of student or teacher diversity is either negative or regardless in the models of overall implementation, transparency, and participation. Accordingly, it could be understood that the current implementations of open government at the school district level are mainly associated with organizations’ physical or human resources but not the perception of demands from citizens.

5. Discussion and Conclusion

In order to specify how open government initiatives are implemented at the meso level and how it is related to the conceptualization at the macro level, this study specifically asks how to explain the variations of accessible, transparent, and interactive features of open government implementation. This question deserves to receive more attention, particularly when people are asking for increasing transparency in government during the pandemic (Lee & Li, 2021; Pramiyanti et al., 2020; Schouten, 2020; Sumar, 2020). Considering the existence of disproportional supply-based analysis on the determinants of open government implementation, this study draws from complexity theory and configurational approach to form an integrative theoretical framework that consists of both supply- and demand-based factors derived from DOI theory and contingency theory. To address the research question, this study focuses on 41 official websites of school districts
located in Union County and Essex County in northern New Jersey. This decision was made because open government examination at this level of government is missing in the literature, but the openness of school districts undoubtedly influence citizens’ lives and trust in regard to government, especially in the context of COVID-19 (Alhouti, 2020; Reyes-Guerra, 2021). The data in this study was collected from multiple sources, for example by conducting a content analysis of each school district’s official website or by analyzing the annual performance reports published by NJDOE. Finally, the collected data was analyzed through the techniques of fsQCA, which enables configurational analysis and small-N research.

The first primary finding of this research revealed that different combinations of supply- and demand-based factors may be associated with greater implementation of open government and that no single factor can be sufficient in all nine possible solutions. Conventionally, the empirical research of e-government or open government tends to focus on supply-based factors (Gauld, Goldfinch, & Horsburgh, 2010; Heeks, & Bailur, 2007; Ohemeng & Ofosu-Adarkwa, 2015; Reddick, 2005). Although the frameworks of TOE and DOI theory attempt to include the effects of contextual factors, input from the end users are missing from both empirical studies and theoretical constructs. One of the contributions of this study is to demonstrate the necessity of an integrative theoretical framework, while the effects of both supply- and demand-based factors have been confirmed. From the perspective of a practitioner, knowing that different combinations can lead to a successful implementation shows a clear signal that there could be multiple options regarding policy tools. For example, for the school districts without sufficient resources, hiring a credentialed superintendent or better examining citizens’ demands might be a good start.
The second main finding is to specify different combinations of factors that are associated with the overall implementation or each aspect of open government. According to the prior section, the conceptualization of open government can be further divided into several sub principles, such as transparency, participation, and/or collaboration. The empirical studies that compare the determinants for these sub principles respectively are limited. Considering the specialty of school districts, this study follows Grimmelikhuijsen and Feeney (2016) to replace the principle of collaboration by accessibility, which denotes whether an accessible website can be created for citizens to reach transparency- and participatory-related documents/information. Interestingly, the results of fsQCA show that the implementation of transparency and participation is more likely to rely on supply-based factors (e.g., organizational resources). This finding may echo the findings from the literature that the implementation of transparency or e-participation includes resource-intensive activities usually requiring efforts of reorganization and long-term fiscal investment. On the contrary, adding a search bar function or providing multi-language documents might require less investment in resources.

The third primary contribution of this study is to demonstrate the importance of racial diversity as a demand-based factor. Historically, the literature of e-government research on local government has repeatedly indicated that specific racial groups, especially non-White citizens, tend to produce less motives for local governments to launch e-government services because of their relatively low socioeconomic status or lower digital skills (e.g., Mossberger, Tolbert, & Franko, 2013; Jun & Weare, 2010). That is, local governments are more likely to have weaker e-government development, while the local context is more diverse or consists of a greater non-White population. Based on
contingency theory, this study, however, shows a different scenario. Within the context of school district, the shared goal between parents and school administrative teams is students’ educational performance or skill development. To achieve this goal, a strong connection or communication is one of the most essential factors. Thus, as the community becomes increasingly diverse, there will be a strong motive for the administrative team to change how it communicates with parents or to adopt new technologies in order to involve more parents/teachers. Thus, it can be anticipated that using social media or providing multi-language documents is an efficient way to attain this goal. Based on the results of the fsQCA analysis, it is apparent that environmental diversity can be associated with greater accessibility, and student diversity is also one of the primary factors leading to superior overall implementation, transparency, or participation. Accordingly, with a research approach enabling a case-oriented description, racial diversity could become a trigger for open government implementation, instead of an impediment.

This research has some limitations and may require follow-up research to validate the findings of this research. Firstly, as an exploratory study that uses the techniques of fsQCA to examine the implementation of open government in school districts, this study only includes 41 school districts in two counties of northern New Jersey, which may therefore mean that there is an issue of external validity. Although fsQCA enables researchers to inductively specify common features or causal factors among multiple cases, it is primarily used for a small-N research project (Ingrams, 2017; Ragin, 2008). It would also be useful to examine in follow-up research whether the findings of this study can be validated in other levels of government or other states following different regulation frameworks. Secondly, while this study attempts to include both supply- and demand-based
factors in an integrative theoretical framework, a greater variety of approaches of operationalization covering diverse indicators would be useful to include. For example, besides racial diversity, citizens’ demands can be assessed from internet penetration rates, online behaviors, citizens’ education attainment, or local media operation (Bearfield & Bowman, 2016), which all require further examination.
Chapter 5. The relationship between exposing to open government data and self-efficacy: A study of survey experiment

1. Introduction

Followed by the prior chapters’ macro and meso analyses on open government, this study examines the potential psychological impacts of using open government services at the micro level in order to specify how open government influences the present democratic system. In particular, this research centers on the topic of open government data and examines whether greater transparency provided by open government data services can empower individuals and increase their self-efficacy in public participation. The concept of open government data can be understood as the publication of government-related data sets in a machine-readable format for public use without restrictions (Attard et al., 2015; Janssen, Charalabidis, & Zuiderwijk, 2012). The reasons to emphasize on open government data can be twofold. First, the main objectives of open government data —promoting transparency, participation, and collaboration—are identical with the main purposes of open government movement. Unlike open government movement, which may rely on multiple approaches to achieve these objectives, the implementation of open government data is generally designed to address these three objectives simultaneously through publishing data sets, facilitating online discussion/deliberation, and encouraging value-added applications (Ruijer, Grimmelikhuijsen, & Meijer, 2017; Writz, Weyerer, & Rosch, 2018). Second, at different levels of government or in different areas around the world, open government data has been widely implemented, making it one of the most common illustrations of the open government movement (Moon, 2020). Thus, while acknowledging that open government data is a narrower application of open government, this chapter still
centers on the topic of open government data to examine its potential impacts on the democratic system and public participation, especially in the context of the U.S.

While open government initiatives or open government data policies have flourished, there is only a limited number of related empirical studies examining their impact. In particular, as the “flagship initiatives of open government programs” (Lourenço, 2015), open government data policies have been expected to promote democracy by pursuing the three objectives of open government initiatives (Attard et al., 2015; Ruijer et al., 2017; Wirtz et al., 2018; Zuiderwijk & Janssen, 2015), but the empirical evidence to support certain propositions has been scarce in the literature. Following the general perception that a well-functioning democracy relies on information (Fosu & Akpojivi, 2015; Riley, 1983), the proposed benefit of open government data is mainly built on citizens’ greater information accessibility since “informed citizens are better able to contribute to democratic processes, better able to understand and accept the basis the decisions affecting them and better able to shape the situation in which they live” (Ruijer, Grimmelikhuijsen, & Meijer, 2017: 45). Current empirical studies tend to explore the link between governments’ transparency and individuals’ trust toward governments (e.g., Grimmelikhuijsen, 2012) or policy support (e.g., Porumbescu et al., 2017). These studies pay less attention to open government data. That is, it remains unclear if disseminating government information using the open government data format can really enhance transparency or spur public participation. Without understanding the potential impacts of using open government data, it would be difficult to argue for the instrumental values of open government services or to discern the meaning of open government in relation to contemporary democratic society.
To address this research gap, this study attempts to prove the causal relationship between open government data and self-efficacy, which is understood as individuals’ perceived capacity on a specific task (Gist & Mitchell, 1992; Wood & Bandura, 1989) and which has been found to be a strong predictor for public participation (Finkel, 1985; Gastil & Xenos, 2010; Vecchione & Caprara, 2009). Drawing on social cognitive theory (Gist & Mitchell, 1992; Wood & Bandura, 1989), this study examines three research questions: (1) Can exposure to open government data increase individuals’ sense of empowerment? (2) Can the sense of empowerment be increased when more diverse open government data is provided? and (3) Can the sense of empowerment be increased when open government data is presented in a latent format? The possible contributions of discussing the potential impact of open government data at an individual level are twofold. Theoretically, while open government has been conceptualized to improve the democratic system by enhancing transparency and participation at the macro level (e.g., Hansson, Belkacem, & Ekenberg, 2015), exploring the psychological impacts of open government data on individuals’ self-efficacy is believed to provide empirical evidence to validate certain propositions at the micro level. Practically, the research questions of this study also provide an opportunity to reconsider whether and how government information can be disseminated using an open government data format, considering the issues of information overload (Matheus & Janssen, 2020) or of individuals’ information processing capacity (Lee, Lee-Geiller, & Lee, 2020).

With an aim of examining the above research questions, two online survey experiments were respectively conducted in 2019 and 2021, based on national samples of American adults. Within these two experiments, participants were randomly assigned to
different treatments and control groups. Interventions were based on a between-subject and 2x2 factorial design manipulating two levels of data diversity (low vs. high) and two types of data demonstration (latent vs. manifest). Then, participants were asked to answer four questions regarding their perceived self-efficacy. Considering the domain-specific feature of self-efficacy (Bandura, 2006) and individuals’ familiarity, this study strategically selected the open government data that focused on local high schools’ performance to investigate whether being exposed to this data can enhance individuals’ perceived self-efficacy on participating in local educational affairs. The results of regression models unexpectedly go against our hypotheses in this study regarding the positive effects of accessing to open government data. The results of the first-round experiment demonstrate that being exposed to open government data decreases individuals’ perceived self-efficacy at a statistically-significant level. In addition, for those exposed to more diverse data, there is no significant impact detected. Certain findings remain consistent in the second-round experiment, in which accessing to open government data with latent or manifest formats both contribute to the decrease of self-efficacy.

After articulating the concept of self-efficacy, the next section will go over the theoretical basis of social cognitive theory and three hypotheses. This is followed by the introduction of two online survey experiments, including their design, methods, and primary findings. Within the last section, the interpretations of unexpected research findings will be addressed and linked with prior empirical studies.
2. Theoretical basis

2.1 Defining self-efficacy

The concept of self-efficacy was firstly indicated by Bandura in late 1970s as referring to “beliefs in ones’ capability to organize and to execute the courses of action required to manage prospective situations” (1999: 2). Simply put, self-efficacy can be understood as individuals’ perception regarding their capability for a specific task or activity (Bandura, 2006; Gist and Mitchell, 1992). This concept was derived from a broad social cognitive theory, which contends the reciprocal relationship between individuals' behaviors and environmental factors as well as among cognitive and other personal factors (Wood and Bandura, 1989). Within this framework, self-efficacy is considered to be the primary factor to “mobilize the motivation, cognitive resources, and courses of action needed to exercise control over events in their lives” (Wood and Bandura, 1989: 364). That is, people are more likely to put effort into what they feel they are able to accomplish.

The prior empirical studies have repeatedly demonstrated that individuals’ self-efficacy is associated with multiple types of political participation or civic engagement (Kahne & Westheimer, 2006; Morrell, 2003; Pinkleton & Austin, 2001). In general, the impacts of self-efficacy can be understood from two aspects. First, self-efficacy may lead individuals to the environment in which more controllability can be found, because the choices that exceed their controllability or coping capability may generate extra costs. That is, individuals are more likely to put effort in due to the perception of controllability or qualification (Lee, 2006). For example, within the panel study conducted by Moeller et al. (2014), it was found that individuals’ self-efficacy is a strong predictor for the participation of first-time voters. Second, the perception of self-efficacy can also influence individuals’
behaviors if they notice that their efforts matter. The perception of making a difference could be a strong motive for devotion. For instance, the research of Jung et al. (2011) indicates that the perception of self-efficacy—measured by “I think people like me can influence government”—can positively influence individuals’ online (e.g., subscribing to political listserv) and offline political participation (e.g., participating in demonstrations).

2.2 Main hypothesis: Open government data and self-efficacy

According to social cognitive theory, one of the most important sources of self-efficacy is individuals’ controllability, which provides a causal link between the desired goal and the devoted efforts (Gist & Mitchell, 1992). As Bandura explains (1986: 228), “unless people believe they can produce desired effects and forestall undesired ones by their actions, they have little incentive to act. Whatever factors may operate as motivators, they are rooted in the core belief that one has the power to produce desired results.” For citizens, exposure to relevant government information plays a critical role in cultivating the belief that one is able to produce desired results since such information can demonstrate why their participation matters and how they can participate. For example, the literature on political efficacy has indicated that being exposed to more information or being informed about politics and public affairs does not only supply the essential political knowledge but also facilitates the political cognizance, which further leads to the greater perception of self-efficacy or consistent political participation (Ardèvol-Abreu et al., 2017; Caprara et al., 2009; Gastil and Xenos 2010, Jung et al., 2011; Lee, 2006; Moeller et al., 2014; Newhagen, 1994; Zhou and Pinkleton, 2012). Especially, open government data is featured to empower citizens as the provided machine-readable data denotes government activities and provides opportunities of value-added uses based on personal preferences (Bates,
In this sense, open government data portals can encourage the flow of relevant information to citizens and subsequently impact their sense of self-efficacy (Gist & Mitchell, 1992). Therefore, the first hypothesis is as follows:

Hypothesis 1: Exposing individuals to open government data can increase their perceived self-efficacy.

2.2.1 The diversity of open government data and the assessment of resources

After asking if exposure to open government data can increase self-efficacy, this study asks whether different features/settings of open government data can vary the extent of self-efficacy for the users of open government data. The second hypothesis of this study focuses on the issue of data diversity—in terms of the comprehensiveness of demonstrated content. This hypothesis assumes that higher diversity of open government data can generate distinctive impacts on self-efficacy when individuals conduct the assessment of the provided data. According to Gist and Mitchell (1992), when receiving information cues from the environment, individuals tend to evaluate the received information from the perspective of usability, which further affects their perceived self-efficacy. That is, as more useful information is given to individuals, they will perceive greater usability and confidence. Within the context of open government data, the issue of completeness or diversity is the key factor in determining whether individuals can be provided with bulk data (Huijboom & Van den Broek, 2011; Veljković, Bogdanović-Dinić, & Stoimenov, 2014; Vetrò et al., 2016). Considering that greater diversity means that more usable information is provided, when individuals are exposed to more diverse open government
data, their assessment of available resources is likely to be higher, and the mechanism of enhancing enactive mastery and controllability may become more apparent. The second part of the first hypothesis is thus as follows:

Hypothesis 1a: Greater diversity in terms of content included in open government data has a more diffuse positive impact on levels of perceived self-efficacy when compared to less diverse content.

2.2.2 The format of open government data and the perception of self-efficacy

The other hypothesis regarding the potential impacts centers on the issue of demonstration format. This study argues that the demonstration format with less information load will lead to greater self-efficacy. The concept of information overload can be simply understood as a status of perceiving burdens, while the received information exceeds individuals’ capacity to process (Jacoby, 1984; Meyer 1998; Misra & Stokols, 2012). While encountering information overload, the provided information could become a “hindrance,” although such information is potentially useful (Bawden & Robinson, 2009). As the issue of information is usually observed in the conventional formats of government information dissemination, Grimmelikhuijsen, Piotrowski, and Van Ryzin (2020) conceptualize the conventional dissemination formats requiring accessing to actual government documents or data as “manifest transparency.” On the contrary, the concept of “latent transparency” is conceptualized to address the simplified dissemination format only denoting the accessibility/availability of specific government information without really accessing certain information. It is argued that the latent format of government information will be valued by citizens while the potential accessibility is aware, and the extra costs/risks
of accessing to the manifest format of government information can be prevented (Grimmelikhuijsen, Piotrowski, and Van Ryzin, 2020).

Because of its inherent complexity, the potential risks of information overload caused by open government data have also been repeatedly argued in the literature (Janssen, Charalabidis, & Zuiderwijk, 2012; Lee, Lee-Geiller, & Lee, 2020; Matheus & Janssen, 2020; Ruijer & Meijer, 2020). The demonstration of open government data is different from the traditional dissemination of government information. The implementation of open government data generally emphasizes the importance of providing a “raw” data set for the sake of reusing or empowering citizens to interpret such data set. However, such raw data may indeed lead to burdening users, while users fail to comprehend such data set with adequate knowledge. Thus, drawing on the argument of latent transparency (Grimmelikhuijsen, Piotrowski, and Van Ryzin, 2020), this study assumes that the simplified format of latent transparency, which only underscores citizens’ awareness regarding the availability and accessibility of open government data, will lead to greater self-efficacy. The third part of the first hypothesis is thus as follows:

Hypothesis 1b: A simplified format of latent open government data in terms of only informing the accessibility and availability of open government data has a more diffuse positive impact on levels of perceived self-efficacy when compared to the manifest format.

3. Experiment 1: Data diversity and the perception of self-efficacy

To test the aforementioned hypotheses, this research firstly undertook a between-subject online survey experiment. The manipulation of this experiment was the exposure
of open government data, which was varied in terms of the level of diversity (i.e., no open
government data vs. relatively less diverse open government data vs. relatively more
diverse open government data). The following sections address the design of this first-
round survey experiment, its participants, and primary findings.

3.1 Experimental design

The present study selected educational affairs as the experimental scenario. According
to the essence of self-efficacy, self-efficacy is not a global construct but a domain-specific
one. That is, the examination of self-efficacy requires researchers to focus on a specific
domain to measure individuals’ perceived capability for this specific task. This study
focuses on local educational affairs for the following three reasons. First, the related issues
of local education have been closely connected to Americans’ lives due to a strong
conviction of local control (Feuerstuin, 2002). Certain connections not only create local
education as the primary occasion for public participation but also as the vital component
for the preservation of American democracy (Bacon, 1977; Feuerstuin, 2002; Miller,
1968). Second, as the related statistical information of local education has been collected
and published with a well-developed manner in history, focusing on the scenario of local
education provides a valuable chance to examine whether the dissemination of government
information with a new format of open government data can generate different impacts.
With careful consideration regarding the features of different contexts, the findings of this
examination can further be applied to other public service areas. Third, as the prior chapter
of meso analysis centers on the implementation of open government in New Jersey’s school
districts, focusing on local education to examine individuals’ perceptions can ensure the
consistency of this dissertation.
Figure 8. Design of the first-round experiment

Figure 8 denotes a summary of experimental design focusing on the scenario of local education. Each participant was randomly assigned to one of three groups, including (1) the control group, (2) Treatment Group 1, which received relatively less diverse data, and (2) Treatment Group 2, which received relatively more diverse data. All participants were first asked to read the general instructions regarding the experiment (see Figure 1 in the Appendix) and to answer a series of short questionnaires on their basic demographic information (gender, age, race, and region) as a warm-up. Then, they were directed to a scenario about the school system in a hypothetical city called Middletown. They were asked to imagine that they are the resident of Middletown with two children studying in a local high school.

Unlike the participants in the control group, who were directed to the next section, participants in the two treatment groups were provided with a brief introduction regarding data publication in Middletown (as shown in Figure 2 in the Appendix 3-2) and a mimicked webpage of open government data. The format of this open government data webpage was conceived by following the contemporary practices of the City of Chicago and the State of New Jersey. This webpage included the following elements: (1) a brief introduction regarding the provided data, (2) the technical information of the provided data (e.g., the
last updated date), (3) a preview of the data set, and (4) an explanation of involved indicators. To manipulate the level of diversity in the content of open government data, a different number of indicators of school performance data were provided. The data set in Treatment Group 1 (as shown in Figure 3 in the Appendix) only included one basic piece of information (the number of students) and three primary test-based performance indicators (i.e., general rating score evaluated by the DOE, the average scores of ACT, and PLAN). On the contrary, the data set in Treatment Group 2 (as shown in Figure 4 in the Appendix) contained five extra indicators (including dropout rate, college enrollment rate, students’ attendance rate, suspension cases, and teachers’ attendance rate). To ensure the treatment is effective, participants of two treatment groups were asked to answer three short questions using the information from the open government data webpage.

Finally, all participants were asked to answer a set of post-test questions, including questions on their perceived self-efficacy. Following Morrell (2003), this research measures individuals’ perceived self-efficacy using four statements with a 5-point Likert-scale: (1) I consider myself well-qualified to participate in decision-making processes of Middletown's school district; (2) I feel that I will be able to do as good a job in handling affairs related to the school board as most other people; (3) I feel that I have a pretty good understanding of issues pertaining to Middletown's school district; (4) I think I am as well-informed about the school district of Middletown as most people. For these statements, the Likert-scale was based on a scale of 1=strongly disagree and 5=strongly agree. These measures are in line with the primary literature concerning domain-specific self-efficacy, which requires individuals to rate their perceived capability or confidence in doing a specific task (Bandura, 2006; Gist and Mitchell, 1992). The term “can do” was not used in
these questions, since it may cause the problem of measuring individuals’ motivation or intention rather than self-efficacy (Williams and Rhodes, 2016). An index of self-efficacy was created based on these four statements (M=3.34; SD=1.04). The Cronbach's alpha is 0.90.

Table 13. Descriptive statistics of survey participants by assigned groups in Experiment 1

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>Treatment 1</th>
<th>Treatment 2</th>
<th>Total</th>
<th>US</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>312</td>
<td>283</td>
<td>245</td>
<td>840</td>
<td></td>
</tr>
<tr>
<td>Age [Mean (SD)]</td>
<td>46.37 (17.36)</td>
<td>46.00 (16.80)</td>
<td>45.37 (16.37)</td>
<td>45.95 (16.87)</td>
<td></td>
</tr>
<tr>
<td>Ideology [Mean (SD)] (1=left to 10=right)</td>
<td>5.76 (2.60)</td>
<td>5.85 (2.73)</td>
<td>5.81 (2.80)</td>
<td>5.81 (2.70)</td>
<td></td>
</tr>
<tr>
<td>Affluence [Mean (SD)]</td>
<td>-.067 (1.71)</td>
<td>.135 (1.79)</td>
<td>-.077 (1.71)</td>
<td>-.002 (1.74)</td>
<td></td>
</tr>
<tr>
<td>Self-efficacy [Mean (SD)]</td>
<td>3.54 (.96)</td>
<td>3.26 (1.02)</td>
<td>3.18 (1.10)</td>
<td>3.34 (1.04)</td>
<td></td>
</tr>
<tr>
<td>Female [%]</td>
<td>49.0</td>
<td>48.8</td>
<td>55.1</td>
<td>50.7</td>
<td>50.8</td>
</tr>
<tr>
<td>Race [%]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>63.78</td>
<td>60.78</td>
<td>60.82</td>
<td>61.90</td>
<td>60.1</td>
</tr>
<tr>
<td>Non-White</td>
<td>36.22</td>
<td>39.22</td>
<td>39.18</td>
<td>38.10</td>
<td>39.9</td>
</tr>
<tr>
<td>No. of Children under 18 [%]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>60.90</td>
<td>60.07</td>
<td>64.75</td>
<td>61.74</td>
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</tr>
<tr>
<td>1</td>
<td>17.31</td>
<td>19.79</td>
<td>18.03</td>
<td>18.36</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>14.74</td>
<td>12.37</td>
<td>13.52</td>
<td>13.59</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>5.45</td>
<td>6.01</td>
<td>2.46</td>
<td>4.77</td>
<td></td>
</tr>
<tr>
<td>More than 4</td>
<td>1.60</td>
<td>1.77</td>
<td>1.23</td>
<td>1.55</td>
<td></td>
</tr>
<tr>
<td>Education [%]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High school or less</td>
<td>30.13</td>
<td>25.44</td>
<td>26.13</td>
<td>27.39</td>
<td></td>
</tr>
<tr>
<td>Some college or assoc. degree</td>
<td>20.51</td>
<td>21.55</td>
<td>26.12</td>
<td>22.50</td>
<td></td>
</tr>
<tr>
<td>College graduate</td>
<td>33.66</td>
<td>35.34</td>
<td>37.14</td>
<td>35.24</td>
<td></td>
</tr>
<tr>
<td>Higher than college graduate</td>
<td>13.46</td>
<td>15.55</td>
<td>8.57</td>
<td>12.74</td>
<td></td>
</tr>
<tr>
<td>Income [%]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than $24,999</td>
<td>25.08</td>
<td>24.03</td>
<td>27.35</td>
<td>25.39</td>
<td></td>
</tr>
<tr>
<td>$25,000 to under $49,999</td>
<td>31.83</td>
<td>28.62</td>
<td>32.65</td>
<td>30.99</td>
<td></td>
</tr>
<tr>
<td>$50,000 to under $74,999</td>
<td>16.72</td>
<td>15.90</td>
<td>12.65</td>
<td>15.26</td>
<td></td>
</tr>
<tr>
<td>$75000 or more</td>
<td>26.36</td>
<td>31.44</td>
<td>27.34</td>
<td>28.36</td>
<td></td>
</tr>
</tbody>
</table>

Note: (1) N=840; (2) No significant group difference is found (using chi-square test) at p<.05.
3.2 Participants

This experiment belongs to an omnibus survey that includes seven short survey experiments that were conducted in 2019. This omnibus survey is funded by the School of Public Affair and Administration and approved by the Institutional Review Board of Rutgers University, Newark. To prevent the unexpected influence among these seven experiments, the order of presentation was fully randomized. The total participants were 840 American adults who were recruited through the Qualtrics survey panel, which is an online research panel in which the participants are considered to be a representation of the general population in the US. Before starting the survey, participants were asked to fill out a consent form. After completing the whole survey, each participant was given a monetary incentive managed by Qualtrics.

Table 13 shows the descriptive statistics of the participants. They are predominately non-Hispanic Whites (61.9%), with an average age of 46 years old. There were slightly more female participants than male participants (50.7% vs. 49.58%). With respect to political ideology, the participants were relatively politically neutral (M = 5.8 on a 1–10 left–right scale). In addition, Table 13 also includes the demographic information of the total American population based on the Census data of 2019. It can be seen that the recruited participants of this study mostly reflect the features of the whole of US in terms of gender and race. However, it should be noted that the education level of the collected sample is higher than the American average in regard to having a college degree or higher

17 Although the participants recruited from Qualtrics are supposed to represent the general US population and are more diverse than convenient samples (e.g., college students) (Buhrmester et al., 2011), it should be underlined that the recruited sample cannot truly represent the whole American population since there is no random sampling. Yet, since the present study is a preliminary exploration on the relationship between open government data and self-efficacy, internal validity rather than external generalizability should be the primary concern.
(47.98% vs. 32.1%). Table 13 further demonstrates the demographic features of participants across all assigned groups. It shows that the process of randomization has successfully generated a fairly balanced sample, while a series of chi-square tests found that there is no obvious difference (in terms of age, gender, race, education, and ideology) for the participants assigned to each group.

3.3 Findings

3.3.1 Hypothesis 1

To answer the first research question—whether exposing to open government data can increase individual’s perceived self-efficacy, a series of OLS regression analyses were conducted. The results were shown in Table 14. Model 1a shows the main effect of accessing to open government data, in which treatment is a binary variable and only participants of two treatment groups are coded as “1”. The results of Model 1a show that, compared with the control group, accessing to open government data leads to the lower perception of self-efficacy by .32 units in average, with an effect size of -.31 (Cohen’s d).

To further illustrate the different impact of two treatment groups, Model 1b demonstrates that the negative effects of accessing to open government data can be found in both treatment groups and the perceived self-efficacy respectively decreases by .28 and .36 units in average compared with the control group. The negative effects of accessing to open government data remains while Model 1c included a set of covariates into the model, such as age, gender, and race. In short, the results of these three models show that exposing to

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18 A one-way ANOVA analysis was also conducted to confirm the main effect of accessing to open government data. Figure 1 in Appendix 3-1 demonstrates the means of self-efficacy (an index ranging from 1 to 5) of the three groups, which are 3.54, 3.26, and 3.18 for Control, Treatment 1, and Treatment 2 respectively. According to the results of Bartlett’s test for equal variances (Chi square = 4.96 and p=.084), the difference of means (1) between control and treatment 1 and (2) between control and treatment 2 are both statistically significant.
open government data decreases individual’s perceived self-efficacy, which is different from the optimistic arguments regarding the positive effects open government data on empowerment (e.g., Lourenço et al., 2013; Susha, Grönlund, & Janssen, 2015; Yavuz & Welch, 2014).

Table 14. Regression analysis of exposing to open government data in Experiment 1

<table>
<thead>
<tr>
<th>Variables</th>
<th>Model 1a (Main effects)</th>
<th>Model 1b (Effects of two treatment group)</th>
<th>Model 1c (Main effects with covariates)</th>
<th>Model 1d (Main effects with interaction term)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment</td>
<td>Coefficient S. E.</td>
<td>Coefficient S. E.</td>
<td>Coefficient S. E.</td>
<td>Coefficient S. E.</td>
</tr>
<tr>
<td>Treat. 1</td>
<td>-.316*** .073</td>
<td></td>
<td>-.335*** .069</td>
<td>-.337***</td>
</tr>
<tr>
<td>Treat. 2</td>
<td></td>
<td>-.280*** .084</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Affluence</td>
<td></td>
<td>-.359*** .088</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Afflu. * Treat.</td>
<td></td>
<td></td>
<td>.128*** .033</td>
<td></td>
</tr>
<tr>
<td>Cons</td>
<td>3.539*** 3.539***</td>
<td>2.340***</td>
<td>2.956***</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>839</td>
<td>839</td>
<td>833</td>
<td>833</td>
</tr>
<tr>
<td>F</td>
<td>18.69*** 9.73***</td>
<td>12.95***</td>
<td>12.74***</td>
<td></td>
</tr>
<tr>
<td>Ad. R square</td>
<td>.021</td>
<td>.020</td>
<td>.137</td>
<td>.134</td>
</tr>
</tbody>
</table>

Note: (1) *p<0.05, **p<0.01, ***p<0.001; (2) Coding of Treatment: participants in the control group = 0, two treatment groups = 1; (3) Within Model 1a, the effect size (Cohen’s d) of Treatment = -.309

To further examine the robustness of certain negative effect, as additional regression models was conducted to include an interaction term—affluence. An individual’s affluence could be understood as his or her socio-economic status. In this study, affluence was measured as a composite variable by adding the standardized values of individual’s
education and income level (M=.002, SD=1.74, Min=-2.88, Max=5.03). Prior studies repeatedly found that an individual’s affluence is highly associated with digital literacy or the capabilities to use ICTs (Furuholt & Kristiansen, 2007; Meyers, Erickson, & Small, 2013; Nasah et al. 2010). In addition, an individual’s affluence has been considered as a strong predictor for the perception of self-efficacy regarding participating in politics (Form & Huber, 1971; Rasmussen & Nørgaard, 2018). According to Model 1d, the negative effect of accessing to open government data is found once again. Compared with control group, accessing to open government data exerts negative and significant effects on individuals’ self-efficacy by .34 unit in average, independently of other covariates. An individual’s affluence status is positively associated with self-efficacy, but no statistically-significant relationships were found for the interaction term. Accordingly, this model indicates that the negative effects of accessing open government data will not vary based on individual’s affluence status.

3.3.2 Hypothesis 1a

The second research question of this study asks whether an increased diversity of open government data can enhance an individual’s perceived self-efficacy for those participants assigned to two treatment groups. Four other OLS regression models of subgroup analysis (as shown as Table 15) were conducted to specify more details, considering that only participants assigned to treatment groups were given manipulated diversity of open government data (4 vs. 9 indicators provided). Within Model 2a, which only included participants in two treatment groups (n=527), the coefficient of high diversity is as low as -.08, and no statistically significant effect was found. A certain phenomenon remained
when a set of covariates was included in Model 2c. This result may echo our prior one-way ANOVA analysis, which indicates the nearly similar means of self-efficacy between Treatment 1 (3.26 units) and Treatment 2 (3.18 units).

Table 15. Regression analysis of diversity in Experiment 1

<table>
<thead>
<tr>
<th>Variables</th>
<th>Model 2a</th>
<th>Model 2b</th>
<th>Model 2c</th>
<th>Model 2d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diversity</td>
<td>Coefficient</td>
<td>S. E.</td>
<td>Coefficient</td>
<td>S. E.</td>
</tr>
<tr>
<td>High (9 ind.)</td>
<td>-.079</td>
<td>.093</td>
<td>-.057</td>
<td>.109</td>
</tr>
<tr>
<td>Affluence</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Afflu. * Divst.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Covariates</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>-.006*</td>
<td>.003</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender (F)</td>
<td>-.007</td>
<td>.092</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child</td>
<td>.055</td>
<td>.049</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>.096**</td>
<td>.033</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Income</td>
<td>.073**</td>
<td>.028</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ideology</td>
<td>.071***</td>
<td>.016</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>Race: Black</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Race: Hispanic</td>
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<td>.127</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Race: Asian</td>
<td>-.149</td>
<td>.210</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Race: Other</td>
<td>-.251</td>
<td>.244</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cons</td>
<td>3.259***</td>
<td>.063</td>
<td>3.208***</td>
<td>.074</td>
</tr>
<tr>
<td>N</td>
<td>527</td>
<td>346</td>
<td>525</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>.73</td>
<td>.28</td>
<td>7.70***</td>
<td></td>
</tr>
<tr>
<td>Ad. R square</td>
<td>-.001</td>
<td>-.002</td>
<td>.123</td>
<td></td>
</tr>
</tbody>
</table>

Note: (1) *p<0.05, **p<0.01, ***p<0.001; (3) Within Model 2a, the effect size (Cohen’s d) of high diversity = -.074

Model 2b is another subgroup analysis, which only included those participants who passed the treatment checks (n=346). In order to ensure the treatment had been effective, participants of two treatment groups were asked to find the required information from the given open government data webpage. Correctly answering two out of three information inquiry questions was considered a successful treatment and included in Model 2b. With this setting, however, the fact that increasing diversity of open government data fails to
enhance individuals’ self-efficacy did not change, which does not support the hypothesis drawn from social cognitive theory.

For the sake of a robustness check, this study further tested whether the effects of exposure to diversified open government data interacted with an individual’s affluence status, following a similar setting and analysis strategies to those used in the previous section. The results are shown in Model 2d. Accordingly, after the interaction term \((Affluence \times Diversity)\) was included, the difference of perceived self-efficacy between Treatment 1 and Treatment 2 remained statistically insignificant. Moreover, although individuals’ affluence status was positively associated with self-efficacy, the coefficient of the interaction term, which consisted of affluence and the diversity of open government data, remained insignificant. That is, no interaction effect between data diversity and affluence was found. All told, based on the four models presented in Table 4, the hypothesis of diversity was rejected.

4. Experiment 2: Data diversity, latent transparency, and self-efficacy

The second experiment of this study was conducted based on the findings and limitations of the first-round experiment. Within the second experiment, apart from repeatedly manipulating data diversity, this study further manipulated the provided format of open government data. While the findings of the first experiment do not support the hypotheses drawn from social cognitive theory, it is suspected that the certain negative impact of open government data may be due to information overload (Jacoby, 1984; Meyer 1998; Misra & Stokols, 2012). That is, an individual’s perceived empowerment may be offset by the fact that the information provided in an medium of open government data
exceeds their capacity to process (Lee, Lee-Geiller, & Lee, 2020; Matheus & Janssen, 2020). Thus, this study followed the design of Grimmelikhuijsen, Piotrowski, and Van Ryzin (2020) to manipulate the provided open government data in a latent format which only enabled individuals to be aware they have the right to access open government data but did not show the data sets. In short, the second experiment of this study employed a 2x2 factorial design (with a control group), which manipulated the diversity and format of the provided open government data.

4.1 Experimental design

As with the first-round experiment, this experiment employed the scenario of local education. However, in order to address the potential concern of information overload, the treatment manipulations were modified. This experiment maintained the manipulation of data diversity by providing high- and low-level comprehensiveness data (4 vs. 9 performance indicators given) but further manipulated the format of the information page of open government data. According to Grimmelikhuijsen, Piotrowski, and Van Ryzin (2020), the format of government information dissemination can be loosely divided into manifest and latent; the former represents that citizens really access government data or information, while the latter indicates that citizens are aware of their right to access such data without really reviewing it. Thus, for participants assigned to the manifest format, the treatment was similar to our first-round experiment in that it demonstrated a mimicked information page of open government data but illuminated the table of data preview, in consideration of the information overload issue. For participants assigned to the latent

---

19 The complete settings of this experiment can be found in Appendix 3-3.
format, the information provided mainly described the process of data publication and the accessibility of such data. These participants were asked to read the following information:

*Publication of school performance data is required under a formal executive order by the mayor and directly managed by the Department of Education of Middletown. Like many cities in the U.S., Middletown's school performance data is organized in a machine-readable format and publicly available. The dataset contains 4 (or 9) key performance indicators and has been updated on a monthly basis since 2000. These 4 (or 9) performance indicators include....*

<table>
<thead>
<tr>
<th>Demographic questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Randomization</td>
</tr>
<tr>
<td>Control</td>
</tr>
<tr>
<td>No info provided</td>
</tr>
<tr>
<td>Treatment 1</td>
</tr>
<tr>
<td>Low data diversity &amp; latent format</td>
</tr>
<tr>
<td>Treatment 2</td>
</tr>
<tr>
<td>High data diversity &amp; latent format</td>
</tr>
<tr>
<td>Treatment 3</td>
</tr>
<tr>
<td>Low data diversity &amp; manifest format</td>
</tr>
<tr>
<td>Treatment 4</td>
</tr>
<tr>
<td>High data diversity &amp; manifest format</td>
</tr>
</tbody>
</table>

**Figure 9. Design of the second-round experiment**

Figure 9 demonstrates the procedures used in this experiment. At the very beginning, each participant was randomly assigned to either the control group or one of the four treatment groups. Participants of the control group received only limited information regarding the scenario setting: *“Please imagine that you are a resident of Middletown, a hypothetical city in the U.S. You are a parent of two children who are studying in a high school in Middletown.”* In contrast, participants of the treatment groups were asked to read the above scenario setting and a brief introduction to the open government data system in the Middletown; then, they were randomly assigned to receive one of the following
manipulated information types: (1) latent format + low data diversity, (2) latent format + high data diversity, (3) manifest format + low data diversity, or (4) manifest format + high data diversity. After receiving different types of information, all participants were asked to respond to four questions of self-efficacy measurement that were identical to the first-round experiment and presented with a five-point Likert scale. The full settings of treatments can be found in the appendix.

4.2 Participants

The second experiment of this study was independently conducted and was not part of any omnibus survey. A total of 960 participants were recruited through Amazon’s Mechanical Turk (MTurk), which is an online outsourcing platform recruiting MTurkers/workers to conduct simple tasks with a monetary incentive. The response quality of MTurk recruitment has been found reliable and similar to that of using conventional laboratory participants (Berinsky, Huber, & Lenz, 2012; Hauser & Schwarz, 2016; Horton, Rand, & Zeckhauser, 2012). Once recruited, participants were directed to the online survey platform of Qualtrics to respond to the survey questions. The responses of the second experiment were collected from July 15th to July 16th, 2021, and the average survey time was around nine minutes. While completing the survey questionnaires, participants received a monetary incentive distributed by MTurk. To ensure that participants were resident in the US, this study followed the protocol proposed by Burleigh, Kennedy, and Clifford (2018) of including a captcha to exclude those participants who were outside the US or using a virtual private network (VPN). An IP review was further processed through Qualtrics to exclude those participants with a duplicated or spam-likely IP address. The
The related demographic features of participants are listed in Table 16, which demonstrates that the collected samples differed from the average U.S. demographic samples in terms of gender, ethnicity, and education. The average age of survey participants was 38.6 years old (SD=11.7), and 76.67% of these participants had a college or graduate degree. With regard to political ideology, participants of this survey tended to
be politically neutral as the average of political ideology was 5.31 (1=left to 10=right). Compared to an average demographic sample of the U.S. population, the selected samples included fewer female participants (43.4% vs. 50.8%), more white participants (74.8% vs. 60.1%), and more highly-educated participants (76.67% vs. 36.1%). In addition, Table 6 shows that the collected samples were fairly balanced between each assigned control or treatment group. A series of Pearson’s chi-square tests was performed to confirm the absence of systematic differences. When the selected samples’ age, gender, ethnicity, education, income, and political ideology were checked, no significant experimental group difference was found, which further confirms the effectiveness of randomization.

4.3 Findings

4.3.1 Hypothesis 1

Similar analysis strategies were applied to those used in the previous experiment. Table 17 demonstrates the main results derived from four regression models to examine whether accessing open government data can influence an individual’s perceived self-efficacy. Within Model 3a, Treatment is a binary variable denoting whether participants were provided with any open government data format (Yes=1). It shows that, for those participants assigned to the four treatment groups, accessing open government data led to a decrease of .23 units in self-efficacy, on average, compared with the control group. Such negative effects of accessing open government data are not only statistically significant ($p=.002$) but have an effect size of -.25 (Cohen’s $d$). This main effect of accessing open government data does not support our first hypothesis, surprisingly, based on social cognitive theory but echoes the findings of our first experiment.
Table 17. Regression analysis of main effects in Experiment 2

<table>
<thead>
<tr>
<th>Variables</th>
<th>Model 3a (Main effects)</th>
<th>Model 3b (With concentration checks)</th>
<th>Model 3c (With covariates)</th>
<th>Model 3d (With the interaction term of affluence)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coefficient</td>
<td>S. E.</td>
<td>Coefficient</td>
<td>S. E.</td>
</tr>
<tr>
<td>Treatment</td>
<td>-.226**</td>
<td>.072</td>
<td>-.237**</td>
<td>.077</td>
</tr>
<tr>
<td>Affluence</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Afflu.*Treat.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Covariates

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficient</th>
<th>S. E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>.008**</td>
<td>.002</td>
</tr>
<tr>
<td>Gender</td>
<td>-.065</td>
<td>.057</td>
</tr>
<tr>
<td>Child</td>
<td>.088**</td>
<td>.029</td>
</tr>
<tr>
<td>Education</td>
<td>.006</td>
<td>.023</td>
</tr>
<tr>
<td>Income</td>
<td>.057**</td>
<td>.018</td>
</tr>
<tr>
<td>Ideology</td>
<td>.025*</td>
<td>.010</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Race: Black</td>
<td>.296***</td>
<td>.082</td>
</tr>
<tr>
<td>Race: Hispanic</td>
<td>.066</td>
<td>.151</td>
</tr>
<tr>
<td>Race: Asian</td>
<td>-.183</td>
<td>.123</td>
</tr>
<tr>
<td>Race: Other</td>
<td>.087</td>
<td>.226</td>
</tr>
</tbody>
</table>

Cons          | 4.033***    | 4.020***| 3.231*** | .191 | 4.028*** |

N             | 960         | 868    | 959      | 960  |
F             | 9.90**      | 9.61** | 7.16***  | 7.28*** |
Ad. R square  | .009        | .010   | .066     | .019 |

Note: (1) *p<0.05, **p<0.01, ***p<0.001; (2) Within Model 3a, the effect size (Cohen’s d) of Treatment = -.254

To further confirm the negative effect of accessing open government data, Table 7 shows the results of three regression models that respectively include concentration checks, covariates, and the interaction term of affluence. Within Model 3b, only those participants who passed concentration checks were involved. This survey experiment included two concentration checks (e.g., a CAPTCHA\textsuperscript{20}), and only those participants who were able to correctly answer one question were included in this model. With concentration checks, the negative coefficient of Treatment was slightly stronger than in Model 2a. The negative effect of accessing open government data remained, while a set of covariates was included.

\textsuperscript{20} The full name is “Completely Automated Public Turing test to tell Computers and Humans Apart.” This mechanism may ask simple questions based on the given imagined information to prevent the hacked participation of computers.
in Model 3c. Following similar settings, Model 3d included the interaction term of individuals’ affluence status and demonstrated the negative coefficient of accessing open government data once again. This model also showed that the negative effects of accessing open government data did not vary based on an individual’s affluence status, which is similar to the finding of our first-round experiment. All told, the negative effects of accessing open government data remained the same across multiple regression models with different settings in two rounds of survey experiment.

4.3.2 Hypothesis 1a

To test the effect of showing highly-diversified open government data, in terms of providing more indicators in the data set, this study conducted a series of subgroup analyses, as shown as Table 18. It should be noted that these regression models only focused on participants assigned to treatment groups; thus, the main effects of high-diversity open government data (9 indicators) in each model were compared with the participants receiving low-diversity open government data (4 indicators) instead of with the control group. Within Model 4a, the higher diversity of open government data, both in latent or manifest format, could increase the perceived self-efficacy by .29 units on average (effect size=.323), compared with the treatment groups which had low-diversity open government data. This finding of the positive effect of high diversity confirms our hypothesis but differs from the results of the first-round experiment. A possible explanation

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21 Given that the samples in this experiment were collected in 2021, the impacts of these covariates may also change due to a different social context. For example, within this model, the strongest variable was being Black (binary), whereas the first-round experiment found no significant effect of being Black across multiple models. This change may be caused by the influence of the Black Lives Matter movement.

22 Interestingly, Affluence was no longer a statistically significant predictor for self-efficacy in Model 3d. This change might be explained by the fact that too many highly-educated participants were included in this survey (almost 78% of participants had a college degree or higher), and no variation could be observed.
for this difference might be the distinct demonstration of open government data. Unlike the treatment in the first-round experiment, the treatment of the manifest group did not display the preview of data set, which may have lowered the concern of information overload to some extent. Thus, participants assigned to both manifest and treatment groups may have perceived greater resource availability or controllability when high-diversity open government data was provided without having the issue of information overload, which led to the greater self-efficacy. The effects of higher diversity of open government data are also shown in Figure 10.

![Figure 10. The effects of higher diversity of open government data](image)

To confirm the robustness of this positive effect, three other regression models were conducted to respectively include the interaction term of affluence and other covariates. As the results of Model 4b, 4c, and 4d show, the positive effects of the higher diversity of open government data remained at a similar level. In addition, within Model 4b and 4d, which included the interaction term of individuals’ affluence status, the results show that the
positive effects of high diversity did not vary according to different levels of affluence status.

**Table 18. Subgroup analysis of exposing to diversified open government data in Experiment 2**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Model 4a (Main effects of diversity)</th>
<th>Model 4b (With interaction term of affluence)</th>
<th>Model 4c (Model of diversity with covariates)</th>
<th>Model 4d (With interaction term &amp; covariates)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>High Diversity</strong></td>
<td>Coefficient 0.285*** S. E. 0.064</td>
<td>Coefficient 0.290*** S. E. 0.063</td>
<td>Coefficient 0.282*** S. E. 0.062</td>
<td>Coefficient 0.281*** S. E. 0.062</td>
</tr>
<tr>
<td><strong>Affluence</strong></td>
<td><strong>0.097</strong>* S. E. 0.027</td>
<td></td>
<td></td>
<td><strong>0.085</strong> S. E. 0.027</td>
</tr>
<tr>
<td><strong>Diversity*Affluence</strong></td>
<td>-0.072 S. E. 0.039</td>
<td></td>
<td></td>
<td>-0.064 S. E. 0.038</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Covariates</th>
<th>Coefficient</th>
<th>S. E.</th>
<th>Coefficient</th>
<th>S. E.</th>
<th>Coefficient</th>
<th>S. E.</th>
<th>Coefficient</th>
<th>S. E.</th>
<th>Coefficient</th>
<th>S. E.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
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<td>.010***</td>
<td>0.038</td>
<td>.010***</td>
<td>0.038</td>
<td>.010***</td>
<td>0.038</td>
<td>.010***</td>
<td>0.038</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td>-.058</td>
<td>0.064</td>
<td>-.057</td>
<td>0.003</td>
<td>-.057</td>
<td>0.003</td>
<td>-.057</td>
<td>0.003</td>
<td>-.057</td>
<td>0.003</td>
</tr>
<tr>
<td><strong>Child</strong></td>
<td>.063</td>
<td>0.033</td>
<td>.063</td>
<td>0.033</td>
<td>.063</td>
<td>0.033</td>
<td>.063</td>
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<td>.063</td>
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</tr>
<tr>
<td><strong>Education</strong></td>
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<td>.025</td>
<td>0.019</td>
<td>.025</td>
<td>0.019</td>
<td>.025</td>
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<td>0.019</td>
</tr>
<tr>
<td><strong>Income</strong></td>
<td><strong>0.053</strong></td>
<td>0.021</td>
<td><strong>0.053</strong></td>
<td>0.021</td>
<td><strong>0.053</strong></td>
<td>0.021</td>
<td><strong>0.053</strong></td>
<td>0.021</td>
<td><strong>0.053</strong></td>
<td>0.021</td>
</tr>
<tr>
<td><strong>Ideology</strong></td>
<td>0.021</td>
<td>0.011</td>
<td>0.022</td>
<td>0.011</td>
<td>0.022</td>
<td>0.011</td>
<td>0.022</td>
<td>0.011</td>
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<td>0.011</td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Race: Black</td>
<td><strong>0.300</strong>*</td>
<td>0.091</td>
<td><strong>0.310</strong></td>
<td>0.090</td>
<td><strong>0.310</strong></td>
<td>0.090</td>
<td><strong>0.310</strong></td>
<td>0.090</td>
<td><strong>0.310</strong></td>
<td>0.090</td>
</tr>
<tr>
<td>Race: Hispanic</td>
<td>-.020</td>
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<td>-.013</td>
<td>0.174</td>
<td>-.013</td>
<td>0.174</td>
<td>-.013</td>
<td>0.174</td>
<td>-.013</td>
<td>0.174</td>
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<tr>
<td>Race: Asian</td>
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<td>-.152</td>
<td>0.142</td>
<td>-.152</td>
<td>0.142</td>
<td>-.152</td>
<td>0.142</td>
<td>-.152</td>
<td>0.142</td>
</tr>
<tr>
<td>Race: Other</td>
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<td>.135</td>
<td>0.261</td>
<td>.135</td>
<td>0.261</td>
<td>.135</td>
<td>0.261</td>
<td>.135</td>
<td>0.261</td>
</tr>
</tbody>
</table>

| **Cons**                | 3.667***    | 3.662*** | 2.808** | .203 | 3.090*** | .175 |
| **N**                   | 769         | 769      | 768      | 768 |
| **F**                   | 20.02***    | 11.23*** | 7.05*** | 7.19*** |
| **Ad. R square**        | .024        | .038     | .080     | .082 |

**Note:** (1) *p<0.05, **p<0.01, ***p<0.001; (2) Participants of control group were excluded; (3) Within Model 4a, the effect size (Cohen’s d) of High Diversity = .323

4.3.3 Hypothesis 1b

The analyses in this section followed similar settings of prior regression models to contrast the effects of two different formats of open government data, namely manifest and latent. Thus, the coefficient of latent format in the first three models listed in Table 19 is the result of contrasting with the manifest format. The treatment of the manifest format was designed to provide more complex mimicked details to assigned participants; conversely, the participants of the latent treatment group were briefly informed of their right to access
the educational performance dataset and the availability of primary indicators in this dataset. As shown as Model 5a, informing users of the right to/availability of open government data information through a simplified format did not have a significant effect on self-efficacy (coefficient=-.036, p=.58), compared with having complex information of open government data. This insignificant effect of the latent format remained the same in both Model 5b and 5c, in which the interaction term of affluence and a series of covariates were included, respectively. Within Model 5b, Latent Format, Affluence, and the interaction effect (Affluence x Latent Format) were not statistically significant. In Model 5c, the most apparent effects were from participant’s age and Black ethnicity.

Table 19. Subgroup analysis of exposing to latent format in Experiment 2

<table>
<thead>
<tr>
<th>Variables</th>
<th>Model 5a (Main effects of latent format)</th>
<th>Model 5b (With interaction term of affluence)</th>
<th>Model 5c (effects of latent format with covariates)</th>
<th>Model 5d (Interaction effects betw. diversity &amp; format)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Format: Latent</td>
<td>-0.036 S.E. 0.064</td>
<td>-0.034 S.E. 0.064</td>
<td>0.011 S.E. 0.063</td>
<td>-0.060 S.E. 0.089</td>
</tr>
<tr>
<td>Affluence</td>
<td>0.023 S.E. 0.029</td>
<td>0.070 S.E. 0.040</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Format*Affluence</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High Diversity</td>
<td></td>
<td></td>
<td>0.255** S.E. 0.089</td>
<td></td>
</tr>
<tr>
<td>Diversity*Format</td>
<td></td>
<td></td>
<td></td>
<td>0.058 S.E. 0.127</td>
</tr>
<tr>
<td>Covariates</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>.010*** S.E. 0.003</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>-0.074 S.E. 0.064</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child</td>
<td>.070* S.E. 0.026</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>.016 S.E. 0.020</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Income</td>
<td>.050* S.E. 0.021</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ideology</td>
<td>.022 S.E. 0.012</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Race: Black</td>
<td>.322** S.E. 0.092</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Race: Hispanic</td>
<td>-0.088 S.E. 0.175</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Race: Asian</td>
<td>-0.176 S.E. 0.144</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Race: Other</td>
<td>.139 S.E. 0.265</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cons</td>
<td>3.824*** S.E. 0.046</td>
<td>3.824*** S.E. 0.045</td>
<td>2.983*** S.E. 0.205</td>
<td>3.697*** S.E. 0.067</td>
</tr>
<tr>
<td>N</td>
<td>769</td>
<td>769</td>
<td>768</td>
<td>769</td>
</tr>
<tr>
<td>F</td>
<td>.31</td>
<td>4.08* S.E. 0.122</td>
<td>5.06*** S.E. 0.055</td>
<td>6.81*** S.E. 0.022</td>
</tr>
<tr>
<td>Ad. R square</td>
<td>-.001 S.E. 0.012</td>
<td>.012 S.E. 0.055</td>
<td>.055</td>
<td>.022</td>
</tr>
</tbody>
</table>

Note: (1) *p<0.05, **p<0.01, ***p<0.001; (2) Participants of control group were excluded; (3) Within Model 5a, the effect size (Cohen’s d) of Latent Format = -.040
The last regression model, Model 5d, only included two primary variables (Format and Diversity) and their interaction term (Format x Diversity). The results show that only the variation of diversity could positively impact the perceived self-efficacy, and certain effects did not vary according to the two different types of format. Thus, the empirical evidence for the hypothesis regarding diversity was confirmed in Experiment 2, but no empirical evidence was found to support our hypothesis regarding the simplified format of open government data.

5. Discussion and Conclusion

Effectively disseminating governmental information to the public has been rooted in the history of the US since the Right to Information movement of the 19th century and the subsequent movements which led to the Freedom of Information Act (FOIA) and New Public Management (NPM) in the 20th century (Ganapati & Reddick, 2012; Grimmelikhuijsen & Meijer, 2012; Grimmelikhuijsen et al. 2013; Meijer et al., 2014; Yannoukakou & Araka, 2014). According to the Open Government Directive signed by President Barack Obama in 2009, the implementation of open government data aims to provide machine-readable and well-organized “raw” data sets that enable citizens to undertake independent analysis, promote public participation, and spur public-private collaboration for value-added services (Conradie & Choenni, 2014; Ganapati & Reddick, 2012; Hossain et al., 2016). Thus, drawing on the open government movement and implementation of open government data, the essence of disseminating government information has been transformed from mainly emphasizing transparency and accountability to fostering greater citizen participation and public-private collaboration
through publishing high-value data sets (Ruijer, Grimmelikhuijsen, & Meijer, 2017). However, although open government data, to some extent, represents one of the most important and widely-implemented policies of open government initiatives, related empirical studies examining its impacts on individuals or democratic systems have been scarce.

Accordingly, this study employed two rounds of survey experiment to investigate potential impacts of open government data on individuals’ perceived self-efficacy, which is a strong predictor of public participation (Oh & Lim, 2014; Schmidthuber, Hilgers, & Rapp, 2019). The experimental results demonstrate empirical evidence which does not support the optimistic hypotheses derived from social cognitive theory—accessing open government data actually decreases an individual’s perceived self-efficacy. According to the results of the first experiment, participants who were given the open government data of local school performance reflected significantly lower self-efficacy regarding participating in local educational affairs or understanding local educational context. Certain negative effects of open government data remained the same in the second experiment, as participants’ perceived self-efficacy was measured identically. With regard to the hypothesis concerning the format of open government data, no empirical evidence was found in the second experiment to support the positive effect of latent format. As concerns the other hypothesis, regarding the diversity of open government data, mixed results were found. The first experiment did not find any significant effects of diversity, whereas the second experiment found that participants who received higher-diversity tended to perceive greater empowerment than participants receiving fewer indicators of the performance data.
Nonetheless, the overall main effects of accessing open government data remained negative.

This study attempted to provide some alternative interpretations for these unexpected results. Initially, the argument of information overload was considered as a possible explanation of why accessing government information as presented by open government data may decrease perceived self-efficacy. The possible impact of information overload was considered, as “the exposure to more data (content) … can also adversely affect our well-being by causing diverse psychological conditions associated with stress: depression, anxiety, a sense of being overwhelmed, and in extreme cases, panic” (Perez, 2008: 56). However, the argument may fail to explain why the negative effects remained in the second experiment, as the treatment of latent format, which is believed less likely to overwhelm participants’ information processing capability, was randomly assigned to some survey participants.

Therefore, this study prefers to interpret the negative effects of open government data from the perspective of the Dunning-Kruger effect (Kruger & Dunning, 1999) and the conventional biased perception against government (Grimmelikhuijsen, Piotrowski, and Van Ryzin, 2020). The Dunning-Kruger effect is conceptualized to address a cognitive bias that “people with substantial deficits in their knowledge or expertise should not be able to recognize those deficits” (Dunning, 2011: 260). Conversely, when people are given more information, their perceived confidence could be further decreased since the provision of extra information merely reminds them of the deficits in their knowledge. Within the context of open government data, as the general public may have limited knowledge of the
government information provided, showing such information may send a strong hint to individuals regarding their knowledge deficit, which further leads to lower self-efficacy.

The other possible explanation for the negative effects of open government data is derived from the conventionally biased perception against government. The literature regarding government trust repeatedly mentions that Americans may tend to be biased toward perceiving government as lacking responsiveness, transparency, or efficiency (e.g., Bennett, 1997; Nelson, 1995). According to the results of the American Trends Panel conducted by the Pew Research Center in 2020, around 78% of respondents say that they never or only some of the time trust the federal government to do the right thing. In this context, disseminating government information may remind people of such negative images of government (Grimmelikhuijsen, Piotrowski, and Van Ryzin, 2020). Similarly, while this study attempted to demonstrate mimicked information or denote accessibility/availability, these treatments may also link to the biased images of government or the speculation regarding the necessity of open government data.

Moreover, the negative effects found could be contributed to by the overall design of these two experiments. First, these two experiments were designed to examine short-term or immediate reactions after receiving the assigned treatments. This research design might be different from prior empirical studies examining the long-term effects of receiving government information or political information. Secondly, the treatments included in these two experiments were passively provided to participants. This setting was also different from some of the prior empirical studies examining the effects of proactive acquisition of information. Accordingly, the related interpretations of research findings of these two survey experiments should also consider the potential effects of experimental
context and the issue of external validity. It remains unknown whether the settings measuring the short-term reaction or passively demonstrating government information systematically changed the research findings of this study, which further indicates the necessity of a follow-up study or a longitudinal research design.

In conclusion, although the research findings of these two experiments might not provide empirical evidence for the positive influence of open government data, the unexpected findings do stimulate more discussion regarding open government data or other open government policy approaches. The hypothesized benefits of open government data on individuals have been identified by the literature—such as self-empowerment (Nugroho et al., 2015; Susa et al. 2015; Zuiderwijk et al., 2014), public participation (Graves & Hendler, 2014; Lourenço et al., 2013; Viscusi et al., 2014), social inclusion (Zuiderwijk & Janssen, 2014), and understanding (Clarke & Margetts, 2014; Janssen, 2011)—but the related empirical evidence has been scarce. This study has attempted to bridge the gap between conceptualizing open government at macro level and its impacts at micro level by providing empirical evidence on self-efficacy. The unexpected finding regarding the negative effects of open government data should not be considered a reason to deny the essentiality or normative value of launching open government data initiatives. In particular, open government data policies could not only trigger “instrumental” effects (e.g., trust in government) but also represent the related “intrinsic” values (e.g., accountability) of open government (Piotrowski, 2017; Writz, Weyerer, & Rösch, 2018). In addition, the related examination should be replicated/expanded to examine the effects on policy compliance, public participation, and social inclusion.
Chapter 6. Conclusion

Open government is considered a new wave of administrative reform that aims to synthesize multiple long-standing reform ideas into one coherent initiative to simultaneously promote government transparency and participation with the assistance of advanced technologies (Coglianese, 2009; McDermott, 2010; Ingrams, Piotrowski, & Berliner, 2020). Open government has become ever more important under the pandemic of COVID-19. In fact, a variety of open government mechanisms/mediums have been employed to improve the dissemination of scientific knowledge and policy guidance, to facilitate the efficient opinion exchange via public participation, and to promote novel solutions generated by public-private collaboration (Hagen et al., 2021; Lovari, D'Ambrosi, & Bowen, 2020; Yiannakoulas et al., 2020). However, the continuing expansion of open government implementation, both domestically and internationally, does not change the fact that its impacts on the quality of government remain unclear. More specifically, how this multidimensional administrative reform can be integrated into contemporary administrative system or change the relationship between government and citizen has not been holistically analyzed. To cope with this research gap, this study employs the framework of governance model to conceive three interrelated research questions that examine the open government movement from three different levels respectively.
1. Summary of research findings

The first study of this dissertation is designed to examine the conceptualization of open government from the macro level. This study strategically asks how the governance model of open government is conceptualized to cope with the identified social problem. Based on the results of the PRISMA systematic review including 189 journal articles, this study indicates that the evidence for the asserted concern of conceptual ambiguity (e.g., Wirtz & Birkmeyer 2015; Yu & Robinson, 2012) might not be sufficient. The collected definitions of these journal articles basically follow the administrative order—Open Government Directive—to conceptualize open government as a new governing structure with three primary pillars, including transparency, participation, and collaboration. The only minor dispute is whether collaboration should be treated independently or involved in the field of public participation. However, although the collected definitions are aligned with each other at the macro level, this systematic literature review further highlights the potential gap between macro-level conceptualization and meso-level implementation of open government. According to the selected papers, this review shows that the meso-level implementation is usually supply driven or transparency centered, which is against the proposition of promoting participation and collaboration.

To further examine the potential gap between macro-level conceptualization and meso-level implementation, the second study of this dissertation aims to empirically investigate those potential factors leading to the variations of open government implementation. An integrative theoretical model is conceived in this study to include both supply- and demand-based factors and the corresponding DOI theory and contingency theory. More importantly, this study determines to focus on the most grassroots public
organization in the U.S—school districts, because school districts have been highly involved in the ecosystem of open government and deeply connected with Americans’ lives. Drawing on the data of 41 school districts and the results of fsQCA analysis, this study clearly indicates the existence of supply-driven implementation. This study respectively examines the effects of five supply- and demand-based factors on different aspects of open government, including accessibility, transparency, and participation. The results demonstrate that supply-based factors can lead to the implementation of all three aspects of open government, but the effects of demand-based factors (operationalized as students’ racial diversity) can only be apparently found in the implementation of accessibility. All told, the implementation of open government is mainly determined by the organizational capacity or resources of public organizations instead of the perceived citizen’s needs.

As a micro-level analysis, the third study of this dissertation empirically examines whether open government initiative can enhance an individual’s perception of empowerment for public participation. More specifically, this study strategically focuses on the topic of open government data and investigate its potential effects on an individual’s perceived self-efficacy of participating in local educational affairs. The decision to focus on open government data was made because it is one of the most common illustrations of the open government initiative (which also echoes the findings of transparency-driven implementation in Study 1) and is designed to pursue all three primary pillars of the open government initiative. To examine the effects of access to open government data, this study conducted two rounds of online survey experiments that recruited 840 and 960 American adults respectively and randomly assigned different treatments to survey participants. The
analysis results demonstrate that access to open government data decreases an individual’s perceived self-efficacy. Moreover, such negative effects will not vary according to an individual’s affluence status, a composite variable made of the individual’s education and income level. That is, for those participants with a high or low affluence status, the negative effects of open government data remained the same. These findings contradict not only the main hypothesis of this study but also the proposition of open government at the macro level.

2. Interpretations of research findings

After reviewing the main findings of the above three studies, this section is devoted to interpreting these findings in a synthesized manner. The first interpretation is theoretical-oriented and based on the theoretical framework of governance model. The primary feature of this governance model framework addresses the dynamics among different levels of analysis (Roberts, 2020). That is, the conceptualization of open government at the macro level could influence how open government is implemented at the meso level and how open government influences individuals at the micro level. Reciprocally, the implementation at the meso level and effects on individuals at the micro level could further reframe the conceptualization of open government at the macro level. The above research findings may indicate that open government is suffering from the concern of reconceptualization. The concern of reconceptualization is not caused by lacking an aligned definition but having a gap between macro conceptualization and meso implementation. More specifically, while the implementation of open government is mainly centered on transparency, the initial proposition of open government to promote participation and collaboration might be questionable. The supply-driven implementation
also implies that such implementation might not properly respond to public needs and might not generate the expected impacts at the micro level. Although the discussion of reconceptualization might exceed the scope of this dissertation, the above research findings do send a clear signal to researchers regarding the incoherence between macro conceptualization and implementation and impacts at the lower level.

The second interpretation is oriented more toward practicality and challenges the conventional transparency-driven implementation of open government. As mentioned previously, the contemporary open government movement aims not only to comprehensively enhance government transparency but also to facilitate public participation (Grimmelikhuijsen and Feeney, 2016; Meijer, Curtin, and Hillebrandt, 2012). In most cases, a key assumption of the open government movement is that greater transparency of government can contribute to greater participation in a variety of public affairs (Attard et al., 2015; Harrison & Sayogo, 2014); conversely, with sustainable and increased public participation, the extent of transparency will eventually be reinforced. Such assumption lays the foundation for the transparency-driven or data-driven implementation of open government. However, the research findings of Study 3 may provide the opposite empirical evidence for this assumption. The data-driven implementation of open government may lead to lower self-efficacy, which could further impede individuals from participating in public affairs. The robustness of this finding is confirmed when two possible treatments, greater diversity and the latent format of open government data, are added into the model. These findings of opposite effects of open government data may require practitioners to reconsider how to better implement open government instead of simply relying on expanding the publication of government data. In
short, this study does not devaluate the intrinsic values of open government or open government data. However, how to strategically implement open government to generate the expected instrumental values might demand follow-up discussions.

3. Future research agenda

Although this dissertation attempts to conceive its research questions based on the framework of governance model, the overall design to examine the influence of open government on the quality of government may still have its limitations. First, while this dissertation is mainly devoted to broadly examine the dynamics among macro, meso, and micro aspects of open government, some interesting issues or details may be neglected. For example, at the macro level, the relationship between the conceptualization of open government and the contemporary legislation system (e.g., FOIA) is not included in this dissertation. Another example regarding meso-level discussion is that this dissertation only focuses on the implementation in the public sector but does not involve the related practices in the private or nonprofit sector. In particular, the examination of conceptualization and implementation with the approach of PRISMA mainly relied on published academic research instead of real practices. Second, considering the limitations of time and resource, the primary arguments of this dissertation are built on the examinations for the selected topics or cases (e.g., centering on the issue of self-efficacy to examine the impact of open government). Due to the multidimensional features of open government, the robustness of these argument should be tested with a variety of cases under the context of open government. Finally, the prior chapters also articulated the limitations of each study in this dissertation. To contend with these limitations, the related suggestions for future research are listed as follows:
1. In the future, examinations regarding the conceptualization of open government could also include practical cases instead of solely focusing on academic sources.

2. In respect to the analysis of determinants, future research could cover the implementations at other levels of government. In addition, the inclusion of a large-N research sample could enhance the external validity.

3. Regarding the examination of the effects of open government, future research should review other potential effects contended in the literature (e.g., trust or satisfaction toward government and the intention of policy compliance) to comprehensively investigate the impact of open government. Furthermore, the operationalization of open government should not be limited to open government data but expand to other types of policy tools of open government initiatives.

4. The overall examination framework of this dissertation is generally based on a U.S.-centric context, in which open government is treated as an administrative reform to facilitate transparency, participation, and collaboration simultaneously. However, the implementation or conceptualization of open government in other geographic areas (e.g., in European countries) may differ vastly. Thus, similar examinations should also be expanded or replicated in other countries.
References


### Appendix 1. Systematic Review

#### Table 1. Extraction materials

<table>
<thead>
<tr>
<th>Category</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic information</td>
<td>The related basic information—including the authors, publication year, journal’s name, and discipline—was collected from the title page of each article.</td>
</tr>
<tr>
<td>Keywords</td>
<td>Based on the framework of Alryalat et al. (2017), the listed keywords of each article were collected and grouped for further analysis.</td>
</tr>
<tr>
<td>Level of analysis</td>
<td>A case’s level of government, if any, for each article was extracted from the abstract or methodological section. The possible levels include national, federal or central, state, and local levels.</td>
</tr>
<tr>
<td>Geographic context</td>
<td>The geographic context was identified and extracted based on the selected open government case of each article.</td>
</tr>
<tr>
<td>Theoretical basis</td>
<td>For the empirical studies, the applied theoretical basis, if any, will be extracted through reading the full text.</td>
</tr>
<tr>
<td>Research Question</td>
<td>The research question of each article will be firstly extracted from the abstract or the introductory section. Secondly, each research question will be divided into three groups depending on its focus: (1) pre-implementation: centering on the examination of why open government policy was adopted or implemented; (2) operation: highlighting the related issues regarding the operational process of open government policy; and (3) post-implementation: focusing on the discussion of the potential impacts or evaluation of open government policy.</td>
</tr>
<tr>
<td>Research Method</td>
<td>Based on Cucciniello, Porumbescu, and Grimmelikhuijsen (2017), the research methods of the collected articles will be extracted through two steps: (1) determining whether the research method is empirical or theoretical or conceptual, (2) determining whether the research method is qualitative, quantitative, or a literature review.</td>
</tr>
<tr>
<td>Definition of open government</td>
<td>The definition of open government was firstly extracted after reading the full text and secondly classified through two steps. The first step is to record whether the listed definition is an original definition or a recycled one based on the literature. Secondly, the listed definition is divided into three groups based on the observed similarities.</td>
</tr>
<tr>
<td>Impacts of open government</td>
<td>For the empirical articles that examined the related impacts of open government, this research follows Cucciniello, Porumbescu, and Grimmelikhuijsen (2017) to classify the extracted impact using two groups: (1) effect on citizens (e.g., the perceived performance of government), and (2) effects on government (e.g., corruption).</td>
</tr>
<tr>
<td>Technology</td>
<td>After reading the full text, the applied technology to achieve or implement open government policy will be extracted.</td>
</tr>
</tbody>
</table>
Appendix 2. fsQCA Analysis

Solution 3

Solution 4

Consistency X≤Y: 0.862
Consistency X≥Y: 0.305
Consistency X≤Y: 0.833
Consistency X≥Y: 0.244

Solution 5

Consistency X≤Y: 1
Consistency X≥Y: 0.232

Figure 1. The XY plots for the model of accessibility
Solution 6

Solution 7

Figure 2. The XY plots for the model of transparency

Solution 8

Solution 9

Figure 3. The XY plots for the model of participation
Appendix 3-1 One-way ANOVA analysis of Experiment 1

Figure 1. Self-efficacy scale (means) by treatment groups in Experiment 1

Note. The difference of means (1) between Control and Treatment 1 and (2) between Control and Treatment 2 are statistically significant at .01 ($p = .003$) and .001 level ($p = .000$) respectively.
Appendix 3-2 Treatments of Experiment 1

Survey Instruction

Please imagine in the following that you are a resident of Middletown, a hypothetical city in the U.S. You are a parent of two children who are studying in a high school in Middletown.

Figure 1: The given instruction for the control group

Survey Instructions

Please imagine that you are a resident of Middletown, a hypothetical city in the U.S. You are a parent of two children who are studying in a high school in Middletown.

Introduction

The Middletown School District has periodically publishes various types of information online. The following dataset contains performance data regarding all public high schools in the Middletown School District. The dataset can be downloaded using different formats, can be analyzed based on individual needs, and can be utilized without any restrictions.

Please take a look at the dataset and answer the related questions.

Figure 2. The given instruction for Treatment 1 & 2
**Middletown Public Schools—The performance report of high schools**

**About this Dataset**
Covering multiple indicators, the dataset details annual performance information of public high schools in Middletown since 2013. This free and openly available dataset can be downloaded through different formats and be used for further analysis without restriction.

<table>
<thead>
<tr>
<th>Basic information</th>
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<tr>
<td>Asset Start date</td>
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</tr>
<tr>
<td>Available Year</td>
</tr>
<tr>
<td>Data Release Frequency</td>
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<td>Source</td>
</tr>
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**Columns in this dataset**

<table>
<thead>
<tr>
<th>Students</th>
<th>The number of current students</th>
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</thead>
<tbody>
<tr>
<td>Rating</td>
<td>The overall rating is made by the Middletown School District by analyzing multiple indicators of performance</td>
</tr>
<tr>
<td>Avg. ACT</td>
<td>The average score of American College Testing, a standardized test for college admissions</td>
</tr>
<tr>
<td>Avg. PLAN</td>
<td>The average score of PLAN, a preliminary test of ACT for sophomore-year students</td>
</tr>
</tbody>
</table>

**Preview of the dataset (Year 2018)**

<table>
<thead>
<tr>
<th>ID</th>
<th>Name</th>
<th>Students</th>
<th>Rating</th>
<th>Avg. ACT</th>
<th>Avg. PLAN</th>
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<tr>
<td>609670</td>
<td>Prosser HS</td>
<td>425</td>
<td>1</td>
<td>25.1</td>
<td>22.06</td>
</tr>
<tr>
<td>609679</td>
<td>Payton HS</td>
<td>657</td>
<td>2</td>
<td>17.9</td>
<td>16.05</td>
</tr>
<tr>
<td>609680</td>
<td>Jones HS</td>
<td>483</td>
<td>1</td>
<td>27.8</td>
<td>23.74</td>
</tr>
<tr>
<td>609682</td>
<td>Simeon HS</td>
<td>542</td>
<td>2</td>
<td>14.8</td>
<td>14.15</td>
</tr>
<tr>
<td>909691</td>
<td>Richards HS</td>
<td>565</td>
<td>3</td>
<td>15.4</td>
<td>14.48</td>
</tr>
<tr>
<td>609693</td>
<td>North-grand HS</td>
<td>446</td>
<td>3</td>
<td>16.9</td>
<td>15.26</td>
</tr>
<tr>
<td>609694</td>
<td>Huntington Park HS</td>
<td>518</td>
<td>1</td>
<td>20</td>
<td>18.63</td>
</tr>
<tr>
<td>909695</td>
<td>G. Washington HS</td>
<td>622</td>
<td>2</td>
<td>16.9</td>
<td>15.84</td>
</tr>
<tr>
<td>609696</td>
<td>Hirsch HS</td>
<td>584</td>
<td>3</td>
<td>16.8</td>
<td>14.96</td>
</tr>
<tr>
<td>609702</td>
<td>Harper HS</td>
<td>633</td>
<td>2</td>
<td>15.7</td>
<td>14.12</td>
</tr>
<tr>
<td>609704</td>
<td>Harlan HS</td>
<td>487</td>
<td>3</td>
<td>13.8</td>
<td>13.59</td>
</tr>
<tr>
<td>609705</td>
<td>Robeson HS</td>
<td>527</td>
<td>2</td>
<td>15.9</td>
<td>14.45</td>
</tr>
<tr>
<td>609707</td>
<td>Foreman HS</td>
<td>641</td>
<td>3</td>
<td>14.1</td>
<td>14.02</td>
</tr>
<tr>
<td>609708</td>
<td>Farragut HS</td>
<td>498</td>
<td>3</td>
<td>13.8</td>
<td>12.65</td>
</tr>
<tr>
<td>609709</td>
<td>Crane HS</td>
<td>564</td>
<td>2</td>
<td>15.4</td>
<td>14.07</td>
</tr>
<tr>
<td>609710</td>
<td>Amundsen HS</td>
<td>766</td>
<td>2</td>
<td>15</td>
<td>14.05</td>
</tr>
<tr>
<td>609711</td>
<td>Hancock HS</td>
<td>481</td>
<td>3</td>
<td>15.1</td>
<td>13.67</td>
</tr>
<tr>
<td>609712</td>
<td>Fenger HS</td>
<td>694</td>
<td>3</td>
<td>14.6</td>
<td>13.81</td>
</tr>
<tr>
<td>609713</td>
<td>Gage Park HS</td>
<td>753</td>
<td>3</td>
<td>13.5</td>
<td>13</td>
</tr>
<tr>
<td>609718</td>
<td>Bogan HS</td>
<td>462</td>
<td>3</td>
<td>16</td>
<td>14.0</td>
</tr>
</tbody>
</table>

**Figure 3: The treatment information for Treatment 1**
Figure 4: The treatment information for Treatment 2
Appendix 3-3 Codebook of Experiment 2

The survey of open government data

Warning!
This survey uses a protocol to check that you are responding from inside the U.S. and not using a Virtual Private Server (VPS), Virtual Private Network (VPN), or proxy to hide your country. In order to take this survey, please turn off your VPS/VPN/proxy if you are using one and also any ad blocking applications. Failure to do this might prevent you from completing the HIT.

For more information on why we are requesting this, see this post from TurkPrime (https://goo.gl/WD6QD4)

End of Block: Warning Message

Start of Block: VPS Warning

Our system has detected that you are using a Virtual Private Server (VPS) or proxy to mask your country location. As has been widely reported, this has caused a number of problems with MTurk data (https://goo.gl/WD6QD4).

Because of this, we cannot let you participate in this study. If you are located in the U.S., please turn off your VPS the next time you participate in a survey-based HIT, as we requested in the warning message at the beginning. If you are outside the U.S., we apologize, but this study is directed only towards U.S. participants.

Thank you for your interest in our study.

End of Block: VPS Warning

Start of Block: Out of the US Warning
Q53 For some reason we were still unable to verify your country location. We ask you to please assist us in getting this protocol correct. Please enter your MTurk worker ID below and contact the requester for this HIT to report the problem.

Once you click Next, you will be taken to the survey (and certifying that you are taking this survey from the U.S. and not using a VPS). We will be checking locations manually for those who reach this point and you will be contacted if this check identifies you as violating these requirements.

End of Block: Out of the US Warning

Start of Block: Still Missing Warning

Q51 Our system has detected that you are attempting to take this survey from a location outside of the U.S. Unfortunately, this study is directed only towards participants in the U.S. and we cannot accept responses from those in other countries (as per our IRB protocol).

Thank you for your interest in our study.

End of Block: Still Missing Warning

Start of Block: Captcha

Q55 Before you proceed to the survey, please complete the captcha below.

End of Block: Captcha

Start of Block: Consent Form

Q39 CONSENT TO TAKE PART IN A RESEARCH STUDY

TITLE OF STUDY: The survey of open government data
Principal Investigator: Kuang-Ting Tai, MPP

This consent form is part of an informed consent process for an online research; it will provide information that will help you decide whether you want to take part in this research. It is your choice whether to take part in this study or not.
Who is conducting this research study and what is it about?
You are being asked to take part in research conducted by Kuang-Ting Tai, MPP, who is a doctoral student in the School of Public Affairs and Administration, Rutgers University. The main purpose of this study is to understand how people judge government transparency. The collected data will only be used for academic research and scholarly publications.

What will I be asked to do if I take part?
The survey will take about 10-15 minutes to complete. We anticipate 1,000 people will take part in the study.

What are the risks and/or discomforts I might experience if I take part in the study?
There are no foreseeable risks to participate in this research. Breach of confidentiality is a possible harm, but a data security plan is in place to minimize such a risk and your response will be anonymous. Also, if some questions make you feel uncomfortable, you can skip those questions or withdraw from the study altogether. If you decide to quit at any time before you have finished the questionnaire, your answers will NOT be recorded.

Are there any benefits to me if I choose to take part in this study?
There are no direct benefits to you for taking part in this research, other than the financial incentives offered by the survey company that has invited you to participate in this research. You will be contributing to knowledge about government transparency.

Will I be paid to take part in this study?
As a compensation for your time, you will receive an amount of USD $1.5 after completing the entire study. The payment will be administered by Amazon Mechanical Turk.

How will information about me be kept private or confidential?
All efforts will be made to keep your responses confidential, but total confidentiality cannot be guaranteed. We will use Qualtrics software to collect and forward your anonymous responses to us. We will not receive any information that can identify you or other subjects. We will download your responses to a secure file that requires a password to access. Only study staff will have access to the password. There is no plan to delete the responses so that they remain available for future research. No information that can identify you will appear in any professional presentation or publication.

What will happen to information I provide in the research after the study is over? The information collected about you for this research will not be used by or distributed to investigators for other research.

What will happen if I do not want to take part or decide later not to stay in the study?
Your participation is voluntary. If you choose to take part now, you may change your mind and withdraw at any point in the survey. You may also choose to skip any questions that you do not wish to answer. However, once you click the 'submit' button at the end of a page, your
responses cannot be withdrawn as we will not know which ones are yours.

Who can I call if I have questions?
If you have questions about taking part in this study, you can contact the Principal Investigator: Kuang-Ting Tai, School of Public Affairs and Administration, phone: 973-353-5093, email: kt428@rutgers.edu. You can also contact my faculty advisor Dr. Gregory Porumbescu, at (phone): 973-353-5093 or (email): greg.porumbescu@rutgers.edu. If you have questions about your rights as a research subject, you can call the IRB Director at: (973) 972-1149.

Please print out this consent form if you would like a copy of it for your files.

Q40 If you do not wish to take part in the research, simply close this website address. If you do wish to take part in the research, follow the directions below:

By beginning this research, I acknowledge that I am 18 years of age or older and have read and understood the information. I agree to take part in the research, with the knowledge that I am free to withdraw my participation in the research without penalty.

Click on the "I Agree" button to confirm your agreement to take part in the research

- I Agree  (1)

- I Do Not Agree  (3)

Skip To: End of Block If Q40 = 3
Q41
We care about the quality of our data. In order for us to get the most accurate measures of your opinions, it is important that you thoughtfully provide your best answers to each question in this survey.

Do you commit to thoughtfully provide your best answers to each question in this survey?

- I commit to giving my best answers (1)
- I don’t commit to giving my best answers (3)
- I can’t commit either way (4)

*Skip To: End of Block If Q41 != 1*

End of Block: Consent Form

Start of Block: Quotas

Q58 What is your age?

________________________________________________________________

Q59 Which best describes your gender?

- Female (1)
- Male (2)
Q60 Which best describes your race/ethnicity?

- White/Caucasian (1)
- Black/African American (2)
- Hispanic/Latino (3)
- Asian (4)
- Other (5)
In which region of the United States do you currently reside?

- Northeast (1)
- Midwest (2)
- West (3)
- South (4)
- Other (US territory, or non-US) (5)

End of Block: Quotas

Start of Block: Survey intro

Q62 In this survey, you will be presented with various descriptions of open government data and asked questions about them. Please read the descriptions carefully and answer the questions as best you can, based on your own experience. Thank you for your cooperation!

End of Block: Survey intro

Start of Block: Manifest 1

Q19
Survey Instructions

Please imagine that you are a resident of Middletown, a hypothetical city in the U.S. You are a parent of two children who are studying in a high school in Middletown.
Q21

Introduction

The Middletown School District has periodically published various types of information on their open data website, which is designed to promote transparency, public participation, and public-private collaboration. The dataset can be downloaded using different formats and can be analyzed based on citizens' needs. There are no restrictions on how the public can use the data.

Please take a look at the information page of the "Report on the Performance of High Schools in Middletown" from this open data website and answer the related questions.
Q17 Timing
First Click (1)
Last Click (2)
Page Submit (3)
Click Count (4)

Q23 Report on the Performance of High Schools in Middletown

About this Dataset
Covering multiple indicators and collected by the Department of Education, this dataset details the performance information from public high schools in Middletown since 2000. This free and openly available dataset can be downloaded through different formats and be used for further analysis without restrictions.

<table>
<thead>
<tr>
<th>Asset Start date</th>
<th>01/02/2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Last Updated</td>
<td>01/02/2021</td>
</tr>
<tr>
<td>Available Year</td>
<td>2000 to 2020</td>
</tr>
<tr>
<td>Data Release Frequency</td>
<td>Monthly Basis</td>
</tr>
<tr>
<td>Available format</td>
<td>CSV, XLS, DTA</td>
</tr>
<tr>
<td>Contact Email</td>
<td><a href="mailto:ContactData@middletown.gov">ContactData@middletown.gov</a></td>
</tr>
<tr>
<td>Source</td>
<td>The Middletown School District</td>
</tr>
</tbody>
</table>

Columns in this dataset: 4 Indicators

<table>
<thead>
<tr>
<th>Students</th>
<th>The number of current students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rating</td>
<td>The overall rating is calculated by the Middletown School District by analyzing multiple indicators of performance</td>
</tr>
<tr>
<td>Avg. ACT</td>
<td>The average score of American College Testing, a standardized test for college admissions</td>
</tr>
<tr>
<td>Avg. PLAN</td>
<td>The average score of PLAN, a preliminary test of ACT for sophomore-year students</td>
</tr>
</tbody>
</table>
Q23
Survey Instruction

Please imagine that you are a resident of Middletown, a hypothetical city in the U.S. You are a parent of two children who are studying in a high school in Middletown.

Q25
Introduction

The Middletown School District has periodically published various types of information on their open data website, which is designed to promote transparency, public participation, and public-private collaboration. The dataset can be downloaded using different formats and can be analyzed based on citizens' needs. There are no restrictions on how the public can use the data.

Please take a look at the information page of the "Report on the Performance of High Schools in Middletown" from this open data website and answer the related questions.
Q21 Timing
First Click (1)
Last Click (2)
Page Submit (3)
Click Count (4)
Q29 Report on the Performance of High Schools in Middletown

About this Dataset
Covering multiple indicators and collected by the Department of Education, this dataset details the performance information from public high schools in Middletown since 2000. This freely and openly-available dataset can be downloaded through different formats and be used for further analyses without restriction.

Basic information

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Asset Start date</strong></td>
<td>01/02/2000</td>
</tr>
<tr>
<td><strong>Last Updated</strong></td>
<td>01/02/2021</td>
</tr>
<tr>
<td><strong>Available Year</strong></td>
<td>2000 to 2020</td>
</tr>
<tr>
<td><strong>Data Release Frequency</strong></td>
<td>Monthly Basis</td>
</tr>
<tr>
<td><strong>Available format</strong></td>
<td>CSV     XLS     DTA</td>
</tr>
<tr>
<td><strong>Contact Email</strong></td>
<td><a href="mailto:ContactData@middletown.gov">ContactData@middletown.gov</a></td>
</tr>
<tr>
<td><strong>Source</strong></td>
<td>The Middletown School District</td>
</tr>
</tbody>
</table>

Columns in this dataset: 9 indicators

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students</td>
<td>The number of current students</td>
</tr>
<tr>
<td>Rating</td>
<td>The overall rating is calculated by the Middletown School District by analyzing multiple indicators of performance</td>
</tr>
<tr>
<td>Avg. ACT</td>
<td>The average score of American College Testing, a standardized test for college admissions</td>
</tr>
<tr>
<td>Avg. PLAN</td>
<td>The average score of PLAN, a preliminary test of ACT for sophomore-year students</td>
</tr>
<tr>
<td>Dropout Rate</td>
<td>The percentage of students who dropout from the school</td>
</tr>
<tr>
<td>College enrollment</td>
<td>The percentage of students who received the admission from college</td>
</tr>
<tr>
<td>Student attendance</td>
<td>The average percentage of individual student attendance</td>
</tr>
<tr>
<td>Suspension</td>
<td>The number of case for student misconducts resulting in suspensions</td>
</tr>
<tr>
<td>Teacher attendance</td>
<td>The average percentage of individual teacher attendance</td>
</tr>
</tbody>
</table>

End of Block: Manifest 2

Start of Block: Latent 1
Q33
Survey Instructions

Please imagine that you are a resident of Middletown, a hypothetical city in the U.S. You are a parent of two children who are studying in a high school in Middletown.

Q35
Introduction

The Middletown School District has periodically published various types of information on their open data website, which is designed to promote transparency, public participation, and public-private collaboration. The dataset can be downloaded using different formats and can be analyzed based on citizens' needs. There are no restrictions on how the public can use the data.

Please take a look at the information page of the "Report on the Performance of High Schools in Middletown" from this open data website and answer the related questions.

Page Break

Q31 Timing

First Click (1)
Last Click (2)
Page Submit (3)
Click Count (4)

Q37

Report on the Performance of High Schools in Middletown

About this Dataset
Publication of school performance data is required under a formal executive order by the mayor and directly managed by the Department of Education of Middletown. Like many cities in the U.S, Middletown’s school performance data is organized in a machine-readable format and
publicly available. The dataset contains 4 key performance indicators and has been updated on a monthly basis since 2000.

These 4 performance indicators include: student population, overall rating, average ACT score, and average PLAN score.

End of Block: Latent 1

Start of Block: Latent 2

Q41
Survey Instructions

Please imagine that you are a resident of Middletown, a hypothetical city in the U.S. You are a parent of two children who are studying in a high school in Middletown.

Q43
Introduction

The Middletown School District has periodically published various types of information on their open data website, which is designed to promote transparency, public participation, and public-private collaboration. The dataset can be downloaded using different formats and can be analyzed based on citizens' needs. There are no restrictions on how the public can use the data.

Please take a look at the information page of the "Report on the Performance of High Schools in Middletown" from this open data website and answer the related questions.
Q39 Timing
First Click (1)
Last Click (2)
Page Submit (3)
Click Count (4)
Q45 Report on the Performance of High Schools in Middletown

About this Dataset
Publication of school performance data is required under a formal executive order by the mayor and directly managed by the Department of Education of Middletown. Like many cities in the U.S, Middletown's school performance data is organized in a machine-readable format and publicly available. The dataset contains 9 key performance indicators and has been updated on a monthly basis since 2000.

These 9 performance indicators include: student population, overall rating, average ACT score, average PLAN score, dropout rate, college enrollment, student attendance, number of suspensions, and teacher attendance.

End of Block: Latent 2

Start of Block: Control

Q47 Timing
First Click (1)
Last Click (2)
Page Submit (3)
Click Count (4)

Page Break

End of Block: Control

Start of Block: Measures of dependent variable
Q22 Please answer the following questions.

Q20 Timing
First Click (1)
Last Click (2)
Page Submit (3)
Click Count (4)

Q26

If you had a chance to participate in a Board of Education in Middletown School District, please indicate the extent to which you agree, or disagree, with the following statements.

<table>
<thead>
<tr>
<th>I consider myself well-qualified to participate in decision making processes of Middletown School District</th>
<th>Strongly disagree</th>
<th>Somewhat disagree</th>
<th>Neither agree nor disagree</th>
<th>Somewhat agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>I feel that I will be able to do as good a job in contributing to the school board as most other people</th>
<th>Strongly disagree</th>
<th>Somewhat disagree</th>
<th>Neither agree nor disagree</th>
<th>Somewhat agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>I feel that I have a pretty good understanding of issues pertaining to Middletown school district</th>
<th>Strongly disagree</th>
<th>Somewhat disagree</th>
<th>Neither agree nor disagree</th>
<th>Somewhat agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>I think I am as well-informed about the school district of Middletown as most people</th>
<th>Strongly disagree</th>
<th>Somewhat disagree</th>
<th>Neither agree nor disagree</th>
<th>Somewhat agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>

End of Block: Measures of dependent variable
Start of Block: IM Check

Q56 Only click on the DOT at the bottom-left corner of this page. Do NOT move the slider labeled 0-10. This is just to screen out random clicking.

<table>
<thead>
<tr>
<th>Very rarely</th>
<th>Very frequently</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>

() |

---

Q57

<table>
<thead>
<tr>
<th>Off (1)</th>
<th>On (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Region #1 (6)</td>
<td></td>
</tr>
<tr>
<td>Region #2 (7)</td>
<td></td>
</tr>
<tr>
<td>Region #3 (8)</td>
<td></td>
</tr>
<tr>
<td>Region #4 (9)</td>
<td></td>
</tr>
</tbody>
</table>
End of Block: IM Check

Start of Block: Demographic Questions

Q42 The last few questions are just some background facts about yourself for statistical purposes.

Q43 What is the highest level of education you have completed?

- [ ] Less than High School (1)
- [ ] High School / GED (2)
- [ ] Some College (3)
- [ ] 2-year College Degree (4)
- [ ] 4-year College Degree (5)
- [ ] Masters Degree (6)
- [ ] Doctoral Degree (7)
- [ ] Professional Degree (JD, MD) (8)
- [ ] Other (please specify) (10) ____________________________________________
Q44 What was your total household income before taxes during the past 12 months?

- Less than $25,000 (1)
- $25,000 to $34,999 (2)
- $35,000 to $49,999 (3)
- $50,000 to $74,999 (4)
- $75,000 to $99,999 (5)
- $100,000 to $149,999 (6)
- $150,000 to $199,999 (7)
- $200,000 or more (8)

Page Break

Q45 Are you currently...?

- Employed (1)
- Business owner or self-employed (2)
- Not employed (retired, disabled, student, homemaker, etc.) (3)

Page Break
Q46 Is your current employer...

- Local government, state government, or federal government (1)
- Non-profit organization (2)
- For-profit company or business (3)
- Family business or farm (4)
- Other (please specify) (5) ____________________________________________

Page Break
Q47 Generally speaking, do you usually think of yourself as a Republican, Democrat, Independent, or what?

- Strong Democrat (1)
- Not Very Strong Democrat (2)
- Independent, Near Democrat (3)
- Independent (4)
- Independent, Near Republican (5)
- Not Very Strong Republican (6)
- Strong Republican (7)
- Other Party (8)
Q48 In political matters, people talk about "the left" and "the right". How would you place your views on this scale, generally speaking?

- Left 1 (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 (5)
- 6 (6)
- 7 (7)
- 8 (8)
- 9 (9)
- Right 10 (10)
Q51 Are you currently married, widowed, divorced, separated, or have you never been married?

- Married (1)
- Widowed (2)
- Divorced (3)
- Separated (4)
- Never married (5)
Q52 How many children under the age of 18 live in your household?

- None (1)
- 1 (2)
- 2 (3)
- 3 (4)
- 4 or more (5)

Page Break

Q55 During the past 12 months, how often have you done volunteer work for a charity?

- Not at all in the past year (1)
- Once in the past year (2)
- At lease 2 or 3 times in the past year (3)
- Once a month (4)
- Once a week (5)
- More than once a week (6)

End of Block: Demographic Questions

Start of Block: Mturk code
Q57
Attention:

This is NOT the last page. Your responses are NOT recorded yet. Please click the "Next" button below to submit your responses.

Thank you again for participating in this study. Your MTurk completion code is: ${e://Field/MTurkCode}

You can submit this code on Amazon Mechanical Turk to apply for approval of your work.

End of Block: Mturk code