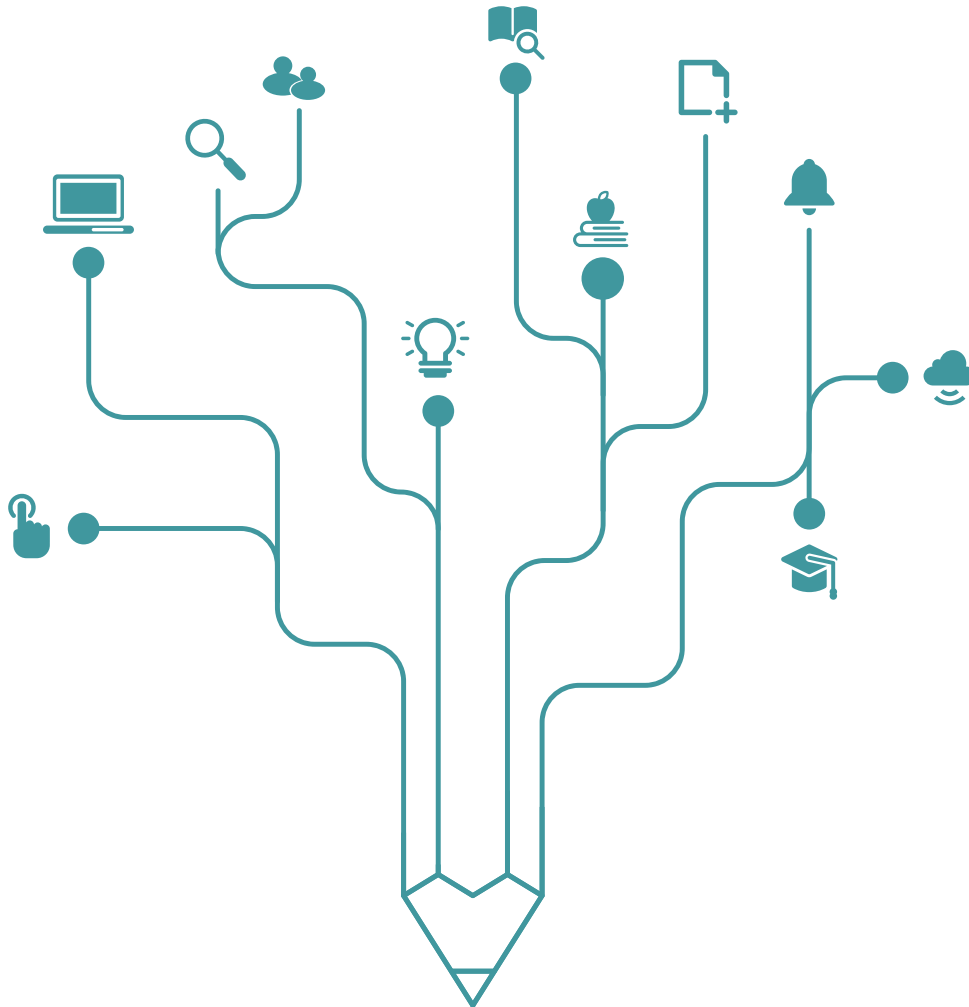


Local Municipality Public Value Co-Creation through Democratic E-Governance: A Mixed Method Analysis of Korean Municipal Government Websites

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**Local Municipality Public Value Co-Creation through Democratic E-Governance:
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Abstract

The use of technology in the public sector can improve the course of government by increasing efficiency and effectiveness, and bolster democratic principles in governance. The aforementioned can occur by employing transparency, accountability, and citizen engagement, thereby bringing the state-citizen relationship closer. Despite the crucial roles of local governments in promoting democratic practices in the e-government context, prior studies tend to have paid limited attention to e-government practices at the local level. Moreover, it was criticized that early e-government practices focused mainly from the provider's perspectives and lost the sense of purpose. In this respect, integrating the concept of public value creation into the discussion of digital government may help this new mode of governance live up to its premises. With the gap in the current literature, this article presents a theoretical framework that portrays how the government and its citizens can interact through technology-mediated devices in the decision-making process, namely democratic e-governance, which leads to public value co-creation. Based on the theoretical ground, we analyzed municipal government websites in Korea, as its e-government system at the national level has been internationally regarded as one of the best practices. With a mixed method approach that integrated a quantitative approach to the website evaluation and qualitative analyses of in-depth interviews, we aimed to investigate the extent to which local democratic e-governance developed, and how public value was co-created through democratic e-governance in Korea. This study contributes to the literature by sharing the link between e-government studies and public value theory with substantiated evidence, and it discovered both prospects and latent challenges of public value co-creation through e-governance at the local level.

Keywords: public value, public value co-creation, democratic e-governance, government website, local e-governance, participatory governance

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INTRODUCTION

The last few decades witnessed the transition of the paradigm of governance from state-centric managerial forms towards a more inclusive and participatory model (Barber, 1984; Becker & Slaton, 2000; Reddel, 2002). In addition, the increasing use of Information and Communication Technologies (ICTs) in the public sector transformed not only administrative approaches, namely e-government, but also the government-citizen relationship described in the concept of e-governance. The use of ICTs may contribute to improving efficiency and effectiveness in public administration and to reinvigorating democratic practices by authorizing public participation.

However, it is criticized that early e-government practices focused mainly from the provider's perspectives, thus lost the sense of purposes. Several scholars pointed out the relevance of public value theory in the e-government studies (Al Rawahi, Combs, & Doherty, 2016; Cordella & Bonina, 2012; Harrison et al., 2012; Karkin & Janssen, 2014; Karunasena & Deng, 2012). However, prior research focused on analyzing e-government practices in public value perspectives and neglected the possibility of integrating the two branches of theories, which hitherto developed separately. Integrating the concept of public value creation into the discussion of digital government may help this new mode of governance live up to its premises. Moreover, prior studies tended to pay limited attention to e-government practices at the local level despite the crucial roles of local governments in promoting democratic practices in the e-government context (Bonsón, Torres, Royo, & Flores, 2012; Rahman, 2010). As public value is defined by citizens and context-dependent, exercising the democratic governance process at the local level is crucial. In response, this article presents a theoretical framework that portrays how the government and its citizens can interact through technology-mediated devices in the decision-making process, namely democratic e-governance, which leads to public value co-creation (Anttiroiko, 2004; Bryson, Sancino, Benington, & Sørensen, 2017; Zhang, Puron-Cid, & Gil-Garcia, 2015).

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Based on the theoretical framework, we argued that a local government website could facilitate democratic e-governance for public value co-creation. In particular, we analyzed municipal government websites in Korea, as its national e-government system was internationally regarded as one of the best; yet, its local level practices were unexamined. The goal was to identify the extent to which local democratic e-governance developed and how public value was co-created through democratic e-governance in Korea. Our research consisted of three sub-questions: (a) whether municipal government websites were as well developed as the national government's website, (b) the maturity level of municipal government websites to facilitate democratic e-governance, and (c) the ways in which municipal government websites served to facilitate the public value co-creation. With the multilayered inquiry, we exploited a mixed method approach that systemically integrated quantitative investigation to the website and qualitative in-depth interviews, in order to provide a comprehensive evidence of the circumstances. (Creswell & Clark, 2017; Hunter & Brewer, 2003).

This article contributes to the literature in the following ways. First, our findings substantiated the coherence between democratic e-government practices and public value co-creation. Second, our study provided multilayered perspectives in e-government studies in terms of public value co-creation. We brought an inspiring and holistic view of local governments' roles in promoting public value co-creation from these results. Lastly, this study discovered both prospects and latent challenges of public value co-creation through democratic e-governance at the local level, implying the relevant area of further research.

We developed a theoretical framework based on public value theory and democratic e-governance as presented in the next section. Subsequently in this work, we describe the research method and the results of multiple data collections. Finally, we discuss the theoretical and policy implications of this study, as well as its limitations and further research directions.

CONCEPTUAL BACKGROUND

The discussions of public value have increasingly appeared within the field of public administration since the late 1990s, seeking for both normative and pragmatic approaches to more collaborative, democratic, and goal-oriented governance (Benington & Moore, 2010; Benington, 2015; Cordella & Willcocks, 2010; Turkel & Turkel, 2016). On the other hand, the increasing adoption of ICTs in the public sector has advanced the digital presence of a government and its citizens, which further developed e-governance processes that allow both parties to interact in the dialog, decision-making, and co-producing public outcomes. In the following, we discuss the concept of public value, its relevance to democratic e-governance, and significance of the local governments' roles, to create a theoretical framework for this research. Then, we discuss the context of e-government initiatives in Korea as for the choice of the case.

1. Public Value Theory

Public value refers to the outcome of governmentally-produced benefits that market mechanisms are unable to generate (Harrison et al., 2012; Moore, 1995). Moore (1994) first introduced the term, public value, to suggest that the goal of public organizations was to create public value in the same way the goal of private institutions was to create private or economic value (Moore & Khagram, 2004). Public value entails not only usefulness of such benefits, but also fairness and equitability in the way they are produced and distributed, in order to meet citizens' expectations for appropriately authorized and productive public organizations (Moore, 1995). In the meantime, what is public value is not defined by those who produce it, but by those who consume it, namely citizens (Alford & Hughes, 2008). In modern democratic systems, citizens decide together what is public value via systems, platforms, devices, and contents that gather collective preferences such as voting (Cordella & Bonina, 2012). More recently, citizens continuously consult the government with what values need to be created by engaging in the daily manners of government actions (Fung, 2006; Ghose, 2005).

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As public value is defined by the citizens, whose perspectives on what is valuable concerning the government's actions are heterogeneous, the different circumstances tend to shape diverse needs and expectations (Cordella & Bonina, 2012; Harrison et al., 2012), and, in turn, public value often contains multiple objectives. Moreover, the priority among the defined public values, for example, national security and economic growth, can vary depending on the point of view of interest groups and social positions in which each is situated (Harrison et al., 2012). In other words, public value is context-dependent as it cannot be detached from the socially shaped context within which it is defined (Cordella & Bonina, 2012; O'Flynn, 2007).

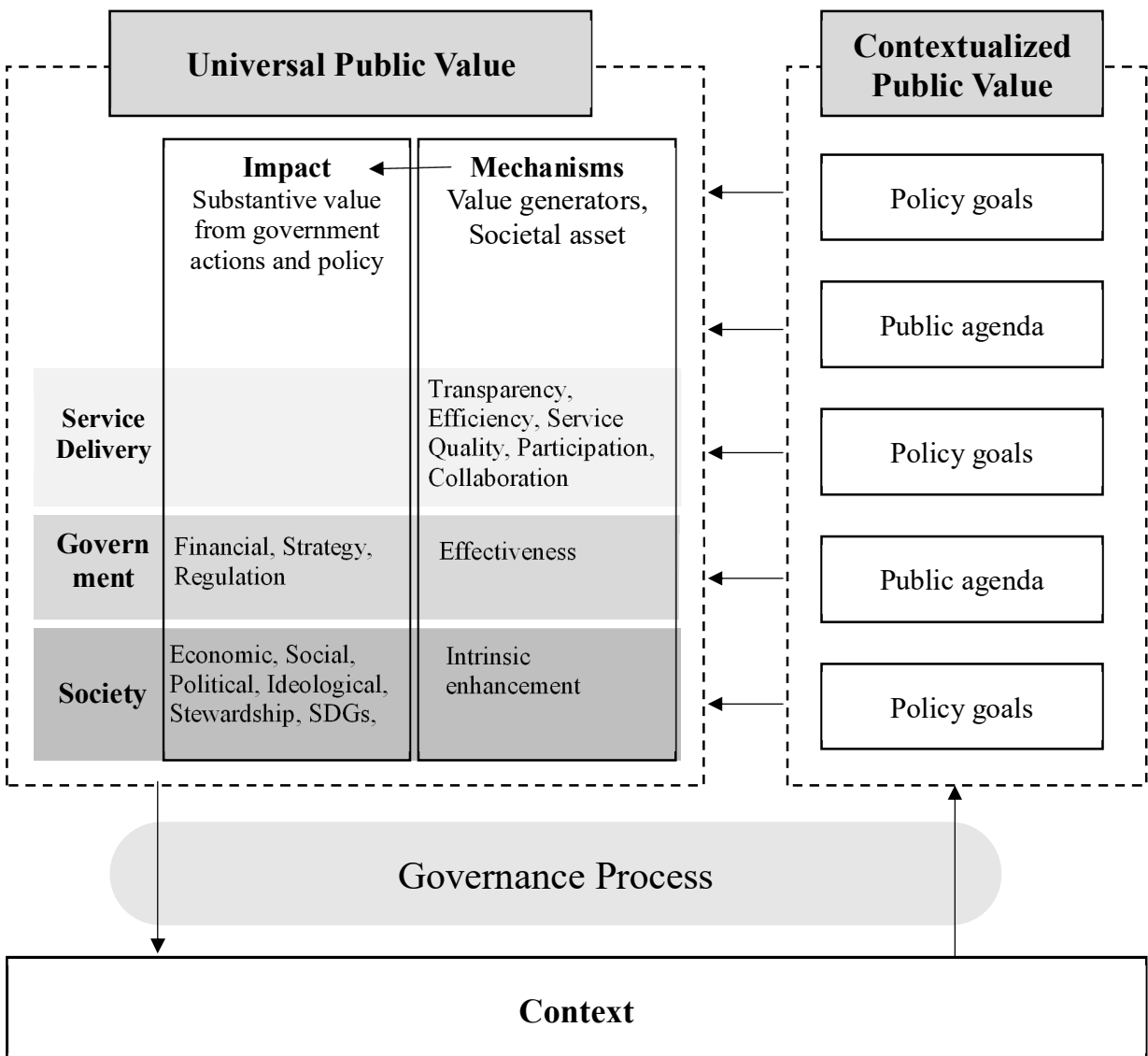
Despite its context-dependency and multiformity, it is possible to differentiate the universally acknowledged public values from distinctive ones that are contextualized. With reference to the public value dictionary, Jørgensen and Bozeman (2007) created different categories in terms of hierarchical relationships and proximity of one another to reveal universal public values that apply to all democratic governments that relate to human dignity, efficiency, effectiveness, transparency, and citizen engagement. In addition, there are distinctive values that citizens in each polity identify reflecting on specific needs and circumstances that may contain revitalizing local markets, family planning policy, and disaster management. In other words, the universal public value comprises basic and overarching principles in governance, while the contextualized public value involves more specific actions and strategies that aim to tackle public problems at the practical level, but eventually align with the universal.

Furthermore, public value can be categorized into 'value generating mechanisms' and 'impact of public actions'. Considering issues related to how value is created, Harrison et al. (2012) distinguished the intrinsic value of a government as a societal asset for facilitating the public value creation from the substantive value of governmental actions, public policies, and service programs that deliver specific benefits directly to individuals, constituents, stakeholders, or organizations. For example,

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value generating mechanisms relate to efficiency, effectiveness, intrinsic enhancement, transparency, participation, collaboration, and the impact of public actions are economic, political and social outcomes, as well as quality of life, ideological, and stewardship. Figure 1 portrays the diagram of various types of public value.

Figure 1. A Relationship Diagram of Types and Levels of Public Value



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There are broadly two modes of public value creation: internal production and co-production. Internal production means public value is produced through internal processes within public organizations, in the way that public service is determined and created internally through the manufacturing logic of value creation which involves in-house and joint-up production within the government (Cordella & Paletti, 2017; Hartley, Alford, Knies, & Douglas, 2017; Osborne, 2010). Co-production indicates that public organizations produce public services with the support of external resources and capabilities provided by citizens and other external actors such as companies and non-governmental organizations, in which production processes are decentralized, and not predetermined (Bryson et al., 2017; Codella & Paletti, 2017; Falco & Kleinhans, 2018a). The degree of allowed involvement of external actors increases from the outsourcing–delegation of planned activities and crowdsourcing–co-producing of solutions to already framed problems (Lee, Hwang, & Choi, 2012; Ye & Kankanhalli, 2015), and open sourcing–fully delegated without the initiative or direct involvement of public organizations (Cordella, 2007; Lee et al., 2012).

Public value creation is highly associated with the democratic principles through the political mandate as given by the citizens in order to protect their natural rights. Governments should not only provide good public services, but also include citizens in decision-making processes (Grimmelikhuijsen & Welch, 2012; Rousseau, 1762). In this way, public value perspectives lead government programs to purposeful actions that promote narrowing the gaps between citizens' expectations and achievements (Cordella & Bonina, 2012). Moreover, due to the complex value structure in the public sector, public value creation is aligned with efforts of promoting democratic participation and elaborating deliberative collaboration in public affairs (Pereira, Macadar, Luiano, & Testa, 2017) to identify public value, develop public programs, and monitor the process and outcomes.

2. Public Value (Co-) Creation through Democratic E-Governance

Since the 1980s, the increasing use of ICTs in the public sector transformed not only the course of government, but also the way of governing. The application of ICTs in public administration, namely *e-government*, seems to improve efficiency and effectiveness in government's performance of disclosing public information and delivering public services. Also, the new technologies have the potential to strengthen democracy, namely *e-democracy*, as citizens can have better access to information about the political process and choices, as well as opportunities to participate through web-based tools and digital platforms (Backus, 2001; Garson, 2006), which creates a closer relationship between citizens and governments (Becker & Slaton, 2000; Pardo, 2002). In this respect, the adoption of ICTs in the public sector around the 21st century gradually contributes to the emergence of more direct, participatory governance, from the managerial governance in the 20th century (Pardo, 2002).

The notion of democratic e-governance describes this new type of governance, in which citizens and government interact using technology-mediated devices for transparent decision making, collaborative policy development, and service process (Anttiroiko, 2004). Technology-mediated platforms, such as government websites, data portals, social media and mobile applications, provide a transparent and open environment where all social entities can participate in the governance processes. However, as democratic e-governance only describes the governance process, rather than the ultimate purposes that such processes be oriented for, democratic e-governance should be viewed as a means towards desirable ends, rather than the purpose itself (Harrison et al., 2012). In this context, public value can be regarded as the desirable end of the governance process and the outcome of democratic e-governance (Harrison et al., 2012; Yu, 2008).

E-government studies drawn from public value perspectives provided a refreshing perspective on the role of the government, as a partner with its citizens beyond a service provider (Benington &

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Moore, 2011; Moore, 1995), and better understanding of the distinctive nature and consequences of ICTs-enabled public sector reforms (Cordella & Bonina, 2012). Considering a government website as an important venue to create public value, scholars conducted government website studies on public value perspectives. While earlier studies on government website design and evaluation tended to focus on technical and e-service features originally developed in disciplines of information systems and business, recent studies (Karkin & Janssen, 2014; Karunasena & Deng, 2012; Kearns, 2004) in public value perspectives expanded the evaluation criteria for these government websites. For example, availability and quality of information (Golubeva, 2007; Harrison et al., 2012; Karunasena & Deng, 2012; Kearns, 2004), efficiency and quality of public services delivery (Harrison et al., 2012; Heeks, 2008; Karunasena & Deng, 2012; Kearns, 2004), levels of citizen satisfaction with services (Karunasena & Deng, 2012; Golubeva, 2007; Kearns, 2004), citizen engagement, dialog, balancing interests, trust between citizens and public institutions (Heeks, 2008; Kearns, 2004), and achievement of social desirable outcomes (Harrison et al., 2012; Heeks, 2008; Kearns, 2004).

In light of public value creation, scholars developed frameworks to measure the public value created through the e-government initiatives, yet this remains nascent. Karunasena and Deng's (2012) conceptual framework for evaluating the public value of the e-government consists of two sub-goals, delivery of public services and efficiency of public organization. These are to be measured by two dimensions: delivery of public services, measured by the quality of information and delivery of services, and user-orientation, and efficiency of public organization, evaluated by efficiency, openness, responsiveness, and environmental sustainability. Their work grasped major functions of public institutions, information sharing, and public service delivery, but overlooked the aspect of citizen engagement, co-production, and public value creation on the societal level.

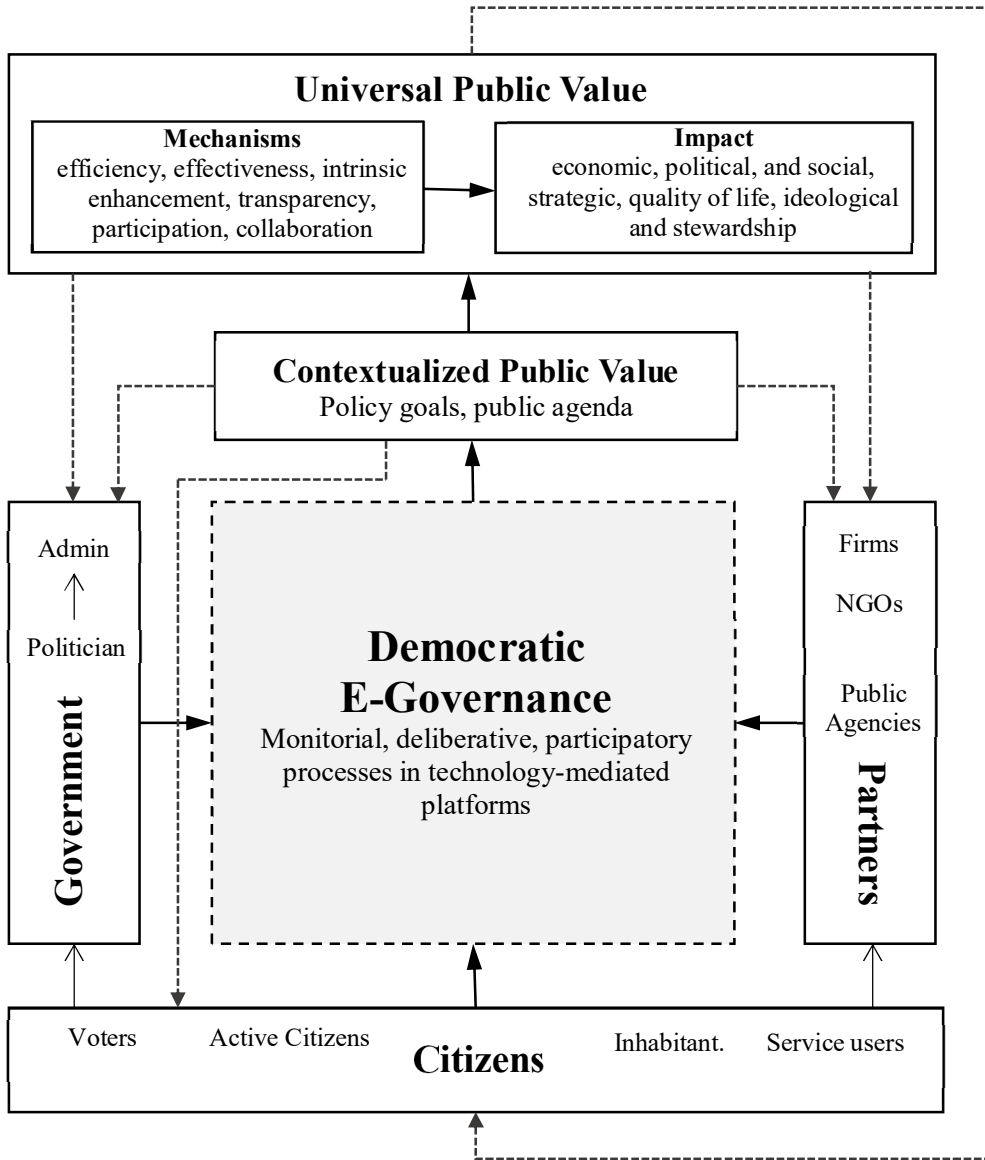
Puron-Cid's (2017) public value creation route provided a multi-layered understanding of public value creation in the e-government context, ranging from the e-government advancement in public

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service delivery, public value creation within government, and in society. This study presented the evidence of a causal relationship between the e-government program and public value creation, not only in public administration, such as transparency, efficiency, and quality of public services, but also in society as a whole as exemplified by the case in Mexico (Puron-Cid, 2017). However, this framework portrays neither the specific process of the public value creation, nor who is involved in the process.

The concept of co-production in the e-government context is greatly associated with public value theory, particularly public value co-creation. With the help of ICTs, co-production becomes more efficient and easier to manage. This can improve the quality of public services by using a collective intelligence created by the deployment of citizens' local knowledge, experience and wisdom through online information, communication, interaction, deliberation and collaboration (Castelnovo & Simonetta, 2007; Fung, 2006). Further, this can enhance the government's administrative capabilities and governance quality by establishing relationships with external agencies that are potentially resourceful to enhance value creation and problem solving capabilities of the government organizations (Margetts & Dunleavy, 2013). It is also believed that public value co-creation through technology-mediated tools can generate significant political and social-cultural assets such as public trust, political efficacy, policy compliance, and the beneficial relationship between citizens and the government (Avgerou, Ciborra, Cordella, Kallinikos, & Smith, 2005). Figure 2 portrays how social entities, including citizens, the government, and non-governmental partners, can engage in democratic e-governance for collective decision-making, problem-solving, and co-production, in order to co-create public value, which in turn benefits not only the government but also society as a whole.

Figure 2. Public Value (Co-) Creation through Democratic E-Governance



3. Public Value (Co-) Creation at the Local Level

Aiming to attain higher efficiency of public administration and enhanced democratic legitimacy in governance, decentralization is another important pillar of various modern paradigms to reform the public sector management (Bendell, Boulter, & Kelly, 1994; Morgan & Murgatroyd, 1994; Osborne & Gaebler, 1992). By transferring political and administrative power and functions from a center to its peripheries (Mansour, 2014), it is expected to achieve quality management, empowerment, organizational reengineering, and reinventing of government towards good governance. Moreover, as the devolved governance is believed to encourage not only political participation, but also the individual choice, it is supported by all political scientists, regardless of their political spectrum (Lawton & Rose, 1994). Transferring political and administrative power and functions to the local governments also implies bringing more adaptive and responsive governance (Brunner & Lynch, 2010; Cuadrado-Ballesteros, 2014; Janssen & Voort, 2016).

In the e-government context, the significance of local governments' positions cannot be reduced. While some argue that ICTs in the public sector provide more efficient systems to meet the needs of the citizens, the national government still face difficulties in delivering customized public services to satisfy the demands of individual citizens with varied perspectives, and in commissioning mass participation at the national level. In other words, the national government alone cannot create the public value that is highly context-dependent and multiformity. In this respect, local governments are believed to play pivotal roles for following reasons.

First of all, local governments can effectively help define and create the public values that are more suitable for the needs of citizens. Local governments are in the closest contact with the citizens among different governments (Barbosa, Pozzebon, & Diniz, 2013), serving as front offices for the government-citizen communication. Also, as original information about the citizens is generated and

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collected by local governments, they can use local knowledge to respond effectively to the contextualized needs of citizens.

Second, local governments make a crucial aspect in the process of democratic governance in terms of the citizen participation (Lowndes, Pratchett, & Stoker, 2001). Citizen engagement is essential for setting public goals, planning strategies, and creating more effective public outcomes (or public value) that are citizen-oriented. At the local level, it is easier for the citizens, enterprises, and other civic organizations to participate in the process of deliberation and decision-making. Also, as citizen participation has educational and psychological effects, the local governments are believed to serve as training grounds and nurseries for mass political education and mobilization (Marshall, 1965; De Tocqueville, 1935). For these reasons, ensuring good participatory practices at the local level is a prerequisite for national democratic governance (Pateman, 1970), as well as an operative strategy to diffuse the governance mechanism of public value co-creation through collaborative networks and partnerships (Warren & Weschler, 1999). In this context, at the local government level, it is possible to find more tangible examples of how e-government initiatives can fulfill public value co-creation towards benefits for citizens, government, and society (Puron-Cid, 2017).

Third, in this way, local governments may assist in putting some political power in the hands of the citizens, thereby making the notion of government of the people, by the people, and for the people more realistic (Lowndes et al., 2001). For these reasons, it is argued that without a system of local government, no political system can be considered complete and democratic (Mawhood, 1993; Wraith, 1964). Thus, realizing democratic e-governance at the local level is essential as it can support the fundamental principle in democratic societies.

Based on the preceding discussion, we created a theoretical framework that described public value co-creation through democratic e-governance at the local level. To be specific, this theoretical framework highlights how digital government service and platforms, which are transparent, high

performing, and open to citizen participation, can facilitate and co-create the public value at the local level. More specifically, based on the theoretical framework, we identified problems of inquiry to examine the extent to which democratic e-governance in Korea, properly established both at the national and local level, could facilitate the public value co-creation. In the following, we discuss a brief background of e-government initiatives in Korea to explicate the reasons for our choice of this case, and then to explain the research procedure in detail. Taken together, this study examined (a) whether local government websites were as well developed as the national government's website, (b) the maturity level of local government websites to facilitate democratic e-governance, and (c) the ways in which local government websites served to facilitate the public value co-creation.

4. Research Context: E-Government Initiatives in Korea

The 1990s saw unprecedented transformations in Korea. The country entered into the era of information-based society and reversed its position from a foreign aid recipient to a donor (Office of Government Policy Coordination, 2017). These changes that urged Korea to redesign its national strategy enhanced the development of public policies that put the ICTs innovation at the core. In 2001, the E-Government Act was enacted to officially legalize the technological transformations at all levels of governments, under the objective of enhancing citizens' quality of life by increasing the productivity, transparency, and democracy of administrative agencies (Song 2007). Under the legal justification, e-government in Korea has come fully into operation.

In the process of the e-government development, the national and local governments worked closely. The national government drove the e-government initiative initially, but local governments actively implemented e-government projects by drafting their own plans and opening websites to adopt electronic administrative processes and duties (Hong, 2005). Despite the efforts of local authorities, the digital divide based on regions, genders, and ages was recognized as a crucial obstacle for coordinating the e-government systems at all levels of governments in order to attain the objectives

of the initiatives in Korea fully (Shin, 2005). To resolve this issue, the national government carried out the Internet training programs, namely ‘Cyber Korea 21’, in each region in order to enhance the digital literacy of the public (Yang, 2007). Also, the implementation of the 31 E-government Projects (2003) prepared the groundwork for linking and integrating government institutions and departments at the national and local levels (Kim & Choi, 2016; Shin, 2005). The continued endeavor for e-governance in Korea came to fruition within a decade of its inception. According to the United Nation’s E-government Index, Korea’s e-government practice reached the final stage of development as of 2010, being first ranked between 2010 and 2014.

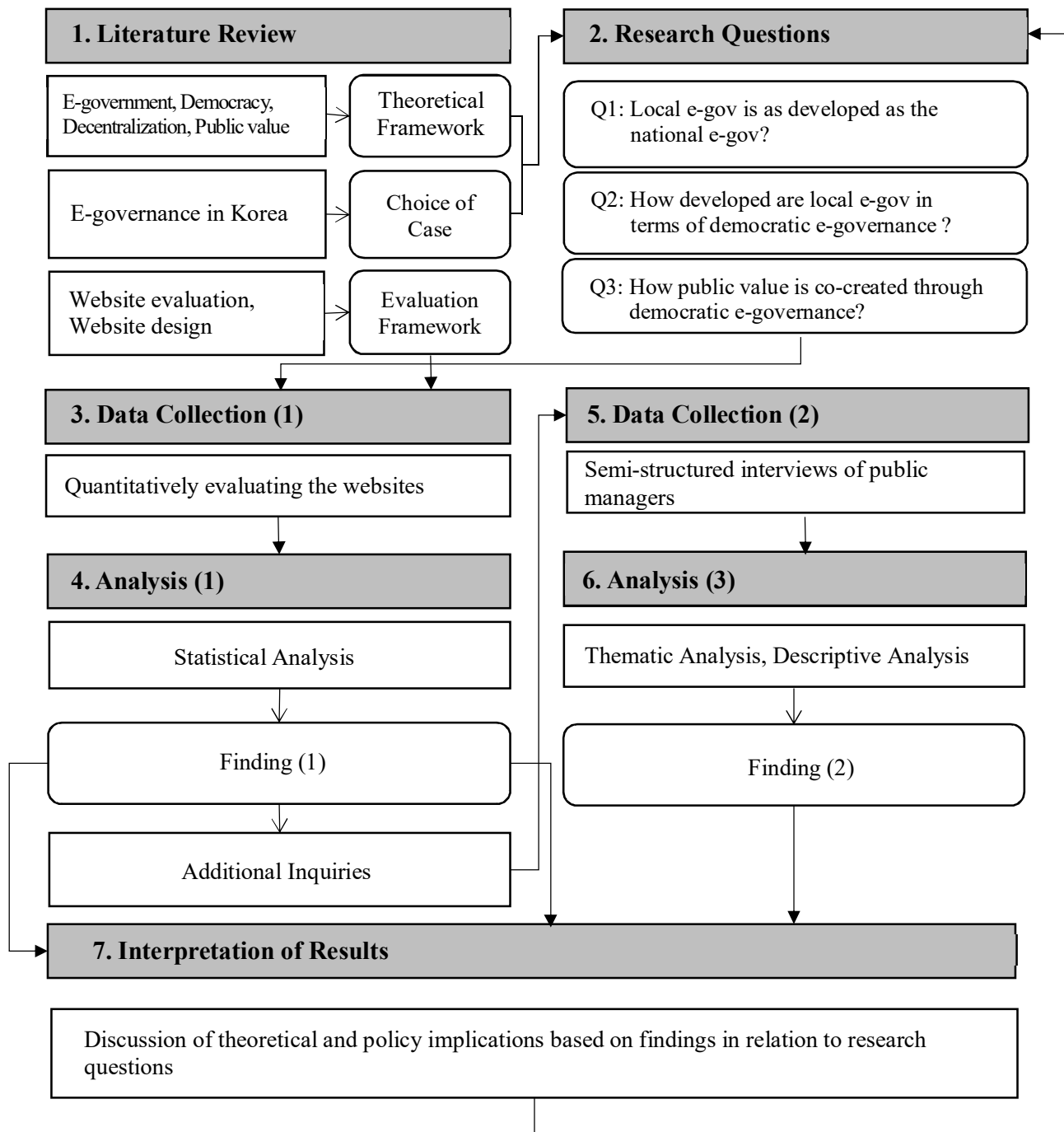
In this context, we chose to examine the local government websites in Korea, particularly, provincial-level divisions, in order to provide a critical diagnosis of the e-government ecosystem based on the democratic e-governance framework for the public value co-creation at the local level. We believed that the choice of Korea’s case could bring valuable insights for two reasons. First, the country’s e-government implementation has been widely acknowledged as the best practice by international organizations (OECD, 2016; UNDESA, 2016), which makes it more plausible to find good examples of public value co-creation through the use of government websites. Second, as little attention was paid to the country’s local e-government performance, this study was expected to provide a comparative view of the national and the local e-government practices, which could support the prescriptive analysis for further policy directions.

METHODS

We exploited a mixed method for this research that systemically integrated qualitative and quantitative research approaches in a single study for purposes of obtaining a fuller picture and deeper understanding of a phenomenon (Creswell & Clark 2017; Galletta, 2013; Hunter & Brewer 2003). We selected this method, considering a multilayered inquiry of this study, which required careful validation processes that ensured the explained discussion was the outcome of the underlying

circumstance, not a mere result of the method (Campbell & Fiske, 1959). As depicted in Figure 3, the current study was composed of seven steps, including the literature review, problem identification, two steps of data collection and analyses, and interpretation of results.

Figure 3. A Mixed Method Procedure for This Study



1. Literature Review

We conducted a literature review to form a theoretical baseline of the study context and the technicality of subject analysis, through which we built not only a theoretical framework for an analytical base, but also a website evaluation framework for an initial data collection.

1.1. Building a Theoretical Framework and Choice of the Case

For building a theoretical framework, we used a keyword search method for conducting the literature review in Google Scholar and multiple online university libraries. The theoretical framework in this study was derived from democracy, e-governance, decentralization, and public value, which resulted in problem identification, specification and configuration concerning this research context and objectives. In addition, we performed a thorough literature review of e-governance studies in Korean contexts to ensure the conceptual relevance and external validity of this study. Based on these two types of literature review, we refined the research question.

1.2. Developing an Evaluation Framework

In order to examine whether and how government websites were transparent, high performing, and open to citizen participation to facilitate to co-create the public value, we constituted an integrated evaluation framework by conducting a qualitative meta-analysis.

A. Criteria Collection

First, we collected website evaluation criteria suggested in the literature, using keyword searches with relevant terms (Hillard, Purpura, & Wilkerson, 2008), including *website evaluation*, *website design*, *website quality*, *service quality*, *e-service*, *public e-service*, *e-government*, *e-government website*, *government websites*, *open government*, *government portal*, and *participatory platform*. As a result, we gathered the literature from various disciplines, such as information systems, e-business, and public administration. We listed evaluation criteria and variables, as well as definitions, and

grouped these by similar definitions, not by terms. This was for the accurate consolidation process, as we found that each study used different terms for similar scopes and definitions.

B. Consolidation of the Criteria

For synthesizing the collected criteria, we constructed *transparency*, *service quality*, and *citizen engagement* dimensions, reflecting the theoretical framework. Transparency dimension was to measure the active disclosure and open access of public information (Grimmelikhuijsen & Welch, 2012). We collected the relevant criteria from the early e-government studies and the emerging open government studies. Service quality dimension was to measure the quality of the service delivery through the website, which involved technical and credibility aspects in the public context. Due to the three conceptual elements of service quality dimension, such as electronic, service, and public (Lindgren & Jansson, 2013), we collected the relevant criteria from studies on website quality, service quality, and public service. Citizen engagement dimension was to assess the extent to which the website layout and tools authorized and facilitated citizens to participate in decision-making processes of public affairs. Thus, we were able to gather relevant criteria from the literature on open government and digital participatory platforms in citizen engagement dimension.

C. Development of the Evaluation Framework

After the initial synthesis of criteria, it was necessary to devise an operational evaluation framework for conducting the evaluation. Thus, we inspected recency, relevance, validity, authenticity, and comprehensiveness of specific variables and definitions, as well as the appropriateness of the categorization, by revisiting the literature. Then, we renamed the grouped criteria, to make it tightly aligned with the concept and practice of each dimension. Also, we refined the definition of each criterion to increase the clarity of the evaluation standards. Table 1 is the evaluation framework developed for this study. Furthermore, we created the evaluation sheet and written instructions for evaluators' reference to perform the evaluation in the same manner.

Table 1. The Evaluation Framework for Government Websites

Dimension	Variable (Items)	Definition	Source
TRANSPARENCY			
	• Accessibility		
	Non-discriminatory	Website is available to anyone with no requirement of registration	Open Government Working Group (2007), Zuiderwijk & Janssen (2014)
	Open License	Information provided is not subject to copyright, privacy or security restrictions, and open licensed	Caba Pérez et al. (2005), Capgemini (2017), Nugroho et al. (2015), Open Government Working Group (2007), Rodríguez Bolívar et al. (2006), Zuiderwijk & Janssen (2014)
	Free of charge	Information and services provided are available free of charge	Capgemini (2017), Zuiderwijk & Janssen (2014)
	Non-proprietary	Information and services provided are in a format over which no entity has exclusive control	Open Government Working Group (2007)
	System availability	Website is usable whenever needed and running in good technical conditions	Papadomichelaki & Mentzas (2012) Parasuraman et al. (2005), Sá et al. (2016)
	• Information		
	Public service standards	Disclosure of officially approved public service standards	Karkin & Janssen (2014)
	Policy agenda	Disclosure of meeting agendas and decisions by the municipal government	Grimmelikhuijsen & Welch (2012), Karkin & Janssen (2014), Manoharan et al. (2017)
	Publications of council reports and performance	Disclosure of periodical activity reports or plans pertaining to performance	Grimmelikhuijsen & Welch (2012), Karkin & Janssen (2014), Manoharan et al. (2017)
	Strategic plans	Disclosure of periodical activity reports on policy and strategy	Grimmelikhuijsen & Welch (2012), Karkin & Janssen (2014), Manoharan et al. (2017)
	Ethical commission	Publication of reports or activities of municipal ethical boards	Karkin & Janssen (2014)
	Level of detail	Information provided is appropriately detailed	Lourenço (2015), Papadomichelaki & Mentzas (2012), Sidi & Juaini (2006)
	Source indications	Indication of validity of information sources and links	Caba Pérez et al. (2005), Open Government Working Group (2007), Rodríguez Bolívar et al. (2006)
SERVICE QUALITY			
	• Interoperability of Services		
	Accuracy	Website provides on-time and accurate services, functioning free from failure upon the first request	Li & Suomi (2009), Loiacono et al. (2002), Papadomichelaki & Mentzas (2012), Parasuraman et al. (2005), Sá et al., (2016)

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Navigational structure	Website's structure is clear and easy to follow	Barnes & Vidgen (2004), Caba Pérez et al. (2005), Huang & Benyoucef (2014), Li & Suomi (2009), Loiacono et al. (2002), Pina et al. (2007), Papadomichelaki & Mentzas (2012)
Content organization	Information and services are organized by categories	Barnes & Vidgen (2004), Sidi & Juaini (2006), Thorsby et al. (2017), Yang & Paul (2005)
Visual elements	Website looks clean and professional, using consistent layout, color, and appealing multimedia features, regardless of technical variances such as resolution, browsers and different language	
	<i>Design</i>	Barnes & Vidgen (2004), Loiacono et al. (2002), Manoharan et al. (2017), Nielsen (1994), Fogg et al. (2002), Sá et al. (2016), Sidi & Juaini (2006), Yang & Paul (2005), Yoo & Donthu (2001)
	<i>Website performance at low resolution</i>	Karkin & Janssen (2014), Loiacono et al. (2002), Parasuraman et al. (2005), Sá et al. (2016)
	<i>Appearances on different browsers</i>	Karkin & Janssen (2014), Loiacono et al. (2002)
	<i>Different language choices</i>	Caba Pérez et al. (2005), Karkin & Janssen (2014), Pina et al. (2007)
Processing capacity	<i>In-site search</i>	Capgemini (2017), Manoharan et al., (2017), Karkin & Janssen (2014), Papadomichelaki & Mentzas (2012), Thorsby et al. (2017)
	Website provides quick transactions	
	<i>Page loading time</i>	Loiacono et al. (2002), Papadomichelaki & Mentzas (2012), Parasuraman et al. (2005), Sidi & Juaini (2006), Yang & Paul (2005)
	<i>Task processing time</i>	Loiacono et al. (2002), Papadomichelaki & Mentzas (2012), Parasuraman et al. (2005), Sidi & Juaini (2006), Sá et al., (2016), Yoo & Donthu (2001)
• Credibility		
Coordination at national level	Website is aligned with the national guidelines on e-government	Capgemini (2017), Pina et al. (2007)
Terms of use statement	Publication of specific service policies in place	Fogg (2003), Torsby et al. (2017)
Privacy	Personal data is provided for authentication and used only for the reason submitted	Fogg (2003), Loiacono et al. (2002), Manoharan et al. (2017), Papadomichelaki & Mentzas (2012), Parasuraman et al. (2005), Pina et al. (2007), Sá et al. (2016)

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Safety	Acquisition of personal data is secure and archived securely	Fogg (2003), Li & Suomi (2009), Loiacono et al. (2002), Manoharan et al. (2017), Papadomichelaki & Mentzas (2012), Parasuraman et al. (2005), Pina et al. (2007), Sá et al. (2016), You & Donthu (2001)
CITIZEN ENGAGEMENT		
• Emotional Appeal	The use of website provide users with fun, exciting and pleasant experience	Bauer et al. (2006), Loiacono et al. (2002), Sá et al. (2016)
• Dialog		
Announcement	Regular activities of municipal work are announced to help decision-making of citizens or firms	Karkin & Janssen (2014)
Alternative channels	Alternative communication channels and means other than online channels are shown	Fogg et al. (2002), Parasuraman et al. (2005), Pina et al., (2007), Sidi & Junaini (2006), Yang & Paul (2005)
Features of collecting, sharing ideas and local knowledge	Website employ tools designed for collecting citizen proposals and local knowledges	Falco et al.(2018), Karkin & Janssen (2014)
Tools for making comments and discussion	Website facilitates the dialog with tools for making comments online	Falco et al. (2018), Karkin & Janssen (2014), Manoharan et al. (2017)
SNS/smartphone application	Website works in connection with other channels such as social media and smartphone application	Karkin & Janssen (2014), Manoharan et al. (2017)
Direct communication with mayor or council members	Website provides a direct communication channel with decision makers	Karkin & Janssen (2014)
• Citizen Support		
Guidelines for using the website	Guidelines or tutorials for using the website are available	Papadomichelaki & Mentzas (2012), Pina et al. (2007), Thorsby et al. (2017)
Help page	Website has inquiry page in which prompt replies and processing status are shown to support users	Bauer et al., (2006), Li & Suomi (2009), Loiacono et al. (2002), Papadomichelaki et al. (2012), Parasuraman et al. (2005), Zuiderwijk & Janssen (2014)
Questionnaires	Website carries out citizen satisfaction questionnaires to improve the services	Falco et al.(2018b), Karkin & Janssen (2014)
Error management	Website is free from failure; in case of any, communication and management of errors are proactive	Fogg (2001), Nielsen (1994), Sidi & Junaini, (2006)
• Collaboration		
Encouragement/promotion of participation	Programs or activities are carried out to encourage citizen participation	Nugroho et al. (2015), Thorsby et al. (2017), Zuiderwijk & Janssen (2014)

Sharing the products and outcomes created through collaboration	ite presents the outcomes created through the public deliberation and oration	Falco et al. (2018b), Thorsby et al. (2017)
Voting and ranking ideas or solutions	Website contains tools to sort ideas and solutions through online voting and ranking tools	Anttiroiko (2009), Baxter (2017), Falco et al. (2018b), Yang & Paul (2005)
Live broadcasting of meetings	Website provides links to watch live broadcasting of meetings	Baxter (2017), Janssen & Helbig (2016), Karkin & Janssen (2014), Pina et al. (2007)
Tools for collaboration	Website provides ICT-mediated tools to allow effective collaboration between the citizens and the government for decision-making	Capgemini (2017), Falco et al. (2018)

2. Data Collection and Analysis

2.1. Evaluation Procedure (1st data collection)

The evaluation was conducted by four coders trained in the technique. For conducting evaluation, the coders studied the evaluation framework and its variables, together with instructions, and previewed a sample of government websites. After this pilot test, ambiguous items and complex issues identified were resolved through group discussion and necessary changes were reflected in the subsequent evaluation procedures.

Afterwards, the coders independently evaluated 17 provincial government websites and the national government website in Korea during the period of March 1 to June 30, 2018. Each variable was measured by a five-point Likert-type scale ranging from 1 (the lowest) to 5 (the highest) and produced the consolidated dataset for statistical analysis. Moreover, Chronbach’s alpha was calculated to test the reliability of all measures in each dimension. As shown in Table 1, the reliabilities of each measure turned out to be acceptable, ranging from .82 and .94 (Huang & Benyoucef, 2014).

2.2. Statistical Analysis

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To estimate the relationship between total score of municipal government website assessment and specific items, the data collected from the questionnaire and observations were coded using STATA 15 (For Windows). Estimates of this model were obtained by ordinary least squares (OLS) with robust option for standard errors. Dependent variables were total score and score of each criterion (T, SQ, and CE) where explanatory variable (item) belonged. Explanatory variables were each items and the other criteria were used for control variables.

We regressed evaluation score on specific evaluation items in order to identify which item significantly affected total assessment. In regression analysis, controlling all items that belong to three dimensions leads to perfect multicollinearity problem (Hair, Black, Babin, & Anderson, 2014). Thus, there were some rules for our model specifications. First, variables with common features in each dimension were grouped. Second, the statistical significance was confirmed by using each group as an explanatory variable in a specification. Finally, for the robustness check, equations were constructed by controlling or excluding items in other dimensions. For example, when examining the effect of accessibility (T-1) in equations (1) to (3), we controlled each of Service Quality (SQ), citizen engagement (CE), or both.

2.3. In-depth Interview (2nd Data Collection)

Lastly, to examine the extent which democratic e-governance in Korea was properly established at the local level to facilitate the public value co-creation, we created supplementary questions for interviews that were not captured and covered by this evaluation framework and practice. Specifically, we arranged phone interviews of 15 public managers who were in charge of e-government programs or/and local government websites in order to deepen our understanding of the phenomenon in early August of 2018. At first, we reached out to public officials of all 17 municipal governments in charge of their website or e-government policy and were able to arrange phone interviews with 15. Furthermore, we collected further information through follow-up email communication. Specifically,

we conducted a semi-structured interview designed to address specific topics of the phenomenon, while leaving space to discover new meanings on the subject (Galletta, 2013).

We designed interview questions in relation to our inquiry of this study with several categories, including organizational background, the experience in using tools on government websites for democratic e-governance, and the process of public value co-creation through the use of such tools, and future expectations. Under each category, we drafted the structured questions that were significant to provide answers to our inquiry, particularly aligned with three dimensions of our evaluation framework, and open-ended questions that allowed interviewees to offer new aspects and insights into the phenomenon.

2.4. Thematic and Descriptive Analysis

After the interview, we conducted a thematic analysis, which involved the process of transcribing, reading and re-reading, analyzing, and interpreting the data (Evans & Lewis, 2017). We used the semi-structured categories as preliminary themes for coding the qualitative contents collected through the interviews. Also, we integrated the unstructured answers that offered new insights on each theme. Then, we interpreted the coded contents based on our theoretical framework. Lastly, we conducted a narrative analysis to capture policy insights and managerial experiences at the municipal government level. After all, we interpreted the findings that resulted from these two steps of data collection, based on the theoretical framework and the research inquiries, in order to advance discussions of theoretical and policy implications.

RESULTS

1. Quantitative Evaluation

1.1. Overall Scores and Rankings

Regarding the first research question, our results found that the national government website performed better than the majority of municipal government websites, and this indicated that

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democratic e-governance at the local level was comparatively limited in Korea. Among the 18 websites evaluated, the national government website was ranked 4th with 189.3 out of 210. In detail, the national government website maneuvered almost perfectly in terms of SQ and outstandingly in CE, but comparatively low in transparency (T). Regarding this finding, through the further examination, we observed that the relatively low score in T could have resulted from its desperate operation of various websites for specific purposes; *Minwon 24* website² for public service delivery—the main government website, *Government Information* website³ for sharing government document, *Document Submission* website⁴ for online document submission, and *Open Government Data portal*⁵ for the publication of data produced by the government. We critically postulated that the separate website operations would limit citizens' perception of transparency in government, which is affected by whether and how a government information is disclosed. In other words, the publication of information should take into account citizens' experiences of finding such information effectively, in order to attain its goals.

On the other hand, several municipal government websites received higher scores than the national government, which hinted at the capabilities of municipal governments and the potential for fulfilling democratic e-governance at the local level. Particularly, the South Jeolla government website was ranked first in total as well as in the CE dimension, followed by Gyeonggi and Daegu government websites. The evaluation results are shown in Table 2.

² www.minwon.go.kr. We found that Minwon 24 website planned to change its name to Government 24 and that was not informed during the initial data collection.

³ www.open.go.kr

⁴ open.godc.go.kr

⁵ www.data.go.kr

Table 2. Overall Democratic E-governance Scores and Rankings

Ranking	Province	Total (210)	Transparency (60)	Service Quality (70)	Citizen Engagement (80)
1	South Jeolla	195.0	56.3	65.5	73.3
2	Gyeonggi	189.8	57.3	61.8	70.8
3	Daegu	189.5	55.5	63.3	70.8
4	National	189.3	48.5	69.0	71.8
5	Seoul	188.5	59.3	58.5	70.8
6	Daejeon	187.5	58.5	61.5	67.5
6	North Jeolla	187.5	55.3	62.0	70.3
8	Incheon	185.5	55.0	64.8	65.8
9	South Gyeongsang	183.5	53.5	65.0	65.0
10	South Chungchung	183.3	56.5	61.5	65.3
11	North Chungchung	182.5	54.8	65.0	62.8
12	Gangwon	181.8	54.8	60.8	66.3
13	North Gyeongsang	181.0	54.3	63.8	63.0
14	Busan	178.5	55.5	59.5	63.5
15	Ulsan	173.8	53.8	60.8	59.3
16	Jeju	172.5	52.3	58.5	61.8
17	Gwangju	167.8	51.3	56.5	60.0
17	Sejong	167.8	52.5	56.3	59.0

1.2. Assessment of Municipal Government Websites

Concerning the second research question, we excluded the data of national government website evaluation from the analysis. Table 3 shows the average score of each criterion of municipal government websites. The total average score of municipal government websites was 182.088, which indicated nearly 86 percent of the democratic e-governance criteria was built-in on website design. In detail, the average score of T, 55.059, was close to the perfect score (60) with the smallest standard deviation (2.122). The standard deviation increased, while the average score decreased, in the order of T, SQ, and CE. Figure 4 shows the comparative overview of the development level of three dimensions.

Table 3. Basic Statistics

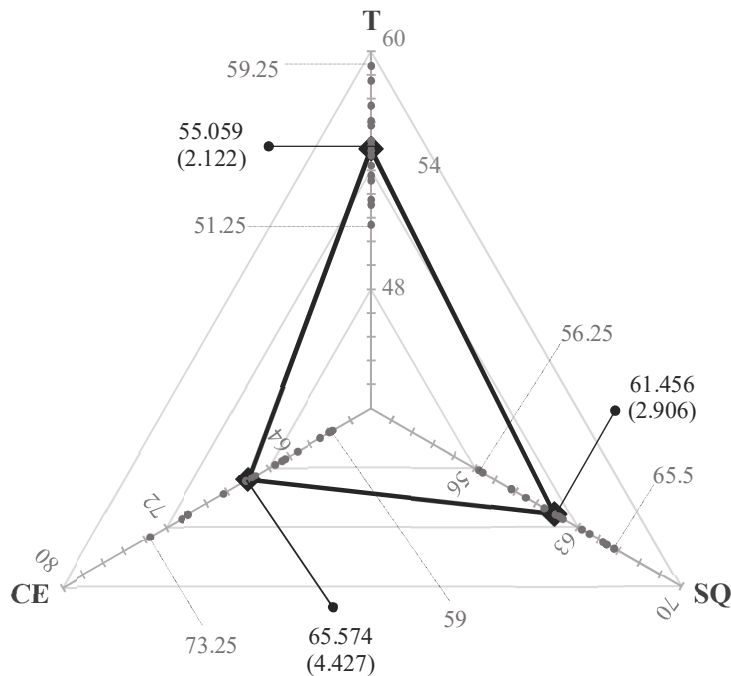
Code	Variable	Mean	Std. Dev.
Transparency		55.059	2.122
T-1	ACCESSIBILITY	24.265	0.841
T-1-1	Non-discriminatory	4.941	0.188
T-1-2	Open license	4.971	0.083
T-1-3	Free of charge*	4.544	0.714
T-1-4	Non-proprietary	4.985	0.061
T-1-5	System availability	4.824	0.422
T-2	CONTENTS	30.794	1.850
T-2-1	Public service standards*	4.721	0.507
T-2-2	Council agenda	4.441	0.682
T-2-3	Publications of council reports and performance*	4.000	0.685
T-2-4	Strategic plans	4.735	0.480
T-2-5	Ethical commission*	3.221	1.007
T-2-6	Level of detail*	4.676	0.482
T-2-7	Source indications	5.000	0.000
Service Quality		61.456	2.906
S-1	INTEROPERABILITY OF SERVICES	42.353	2.536
S-1-1	Accuracy	4.941	0.141
S-1-2	Navigational structure	4.000	0.500
S-1-3	Content organization	4.221	0.612
S-1-4	Visual elements	20.882	1.420
S-1-4-1	Design	4.265	0.576
S-1-4-2	Website performance at low resolutions*	4.294	0.730
S-1-4-3	Appearances on different browsers	4.412	0.579
S-1-4-4	Different language choices*	4.176	0.598
S-1-4-5	In-site search*	3.735	0.455
S-1-5	Processing capacity	8.309	0.946
S-1-5-1	Page loading time*	4.029	0.537
S-1-5-2	Task processing time	4.279	0.558
S-2	CREDIBILITY	19.103	1.183
S-2-1	Coordination at national level	4.985	0.061
S-2-2	Terms of use statement	4.176	1.172
S-2-3	Privacy*	4.941	0.166
S-2-4	Safety	5.000	0.000
Citizen Engagement		65.574	4.427
C-1	EMOTIONAL APPEAL	4.941	0.188
C-2	DIALOG	26.471	2.097
C-2-1	Announcement*	4.956	0.182
C-2-2	Alternative channels	5.000	0.000
C-2-3	Features of collecting, sharing ideas and local knowledge*	4.338	0.838

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C-2-4	Tools for making comments and discussion*	4.559	0.512
C-2-5	SNS/smartphone application*	3.853	0.862
C-2-6	Direct communication with mayor or council members*	3.765	1.297
C-3	CITIZEN SUPPORT	15.132	1.788
C-3-1	User guidelines	2.132	1.108
C-3-2	Citizen support	4.118	0.719
C-3-3	Questionnaires	4.603	0.516
C-3-4	Error management	4.279	0.624
C-4	COLLABORATION	19.029	2.069
C-4-1	Encouragement/promotion of participation	4.824	0.351
C-4-2	Sharing the products and outcomes created through collaboration*	3.132	1.199
C-4-3	Voting and ranking ideas or solutions	3.265	0.817
C-4-4	Live broadcasting of meetings*	4.309	0.634
C-4-5	Tools for collaboration*	3.574	1.018
Total Score		182.088	7.834

* The coefficient of the variable is statistically significant in regression analysis.

Figure 4. Radar Chart of Dimensional Scores of Local Government Websites



Total Score : 182.088 (7.834), Min:167.75, Max: 195
 Minimum score in each axis is equal to a 70 percent point at the full scale of each dimension.

This implies that municipal government websites tended to be well equipped with a basic condition, such as information sharing, while less prepared in terms of public e-service and citizen engagement. We also found a higher dimension score in CE tended to contribute to a greater overall score. To substantiate this postulation, we conducted additional analyses of the relationships between each dimension score and the total score. Figures 5, 6, and 7 reveal the scatter plot and the linear fitted line of each dimension, confirming that T and SQ have relatively low correlation with total score, but CE has high correlation with total score.

Figure 5. Dispersion and a Fitted Line between the Total Score and Transparency

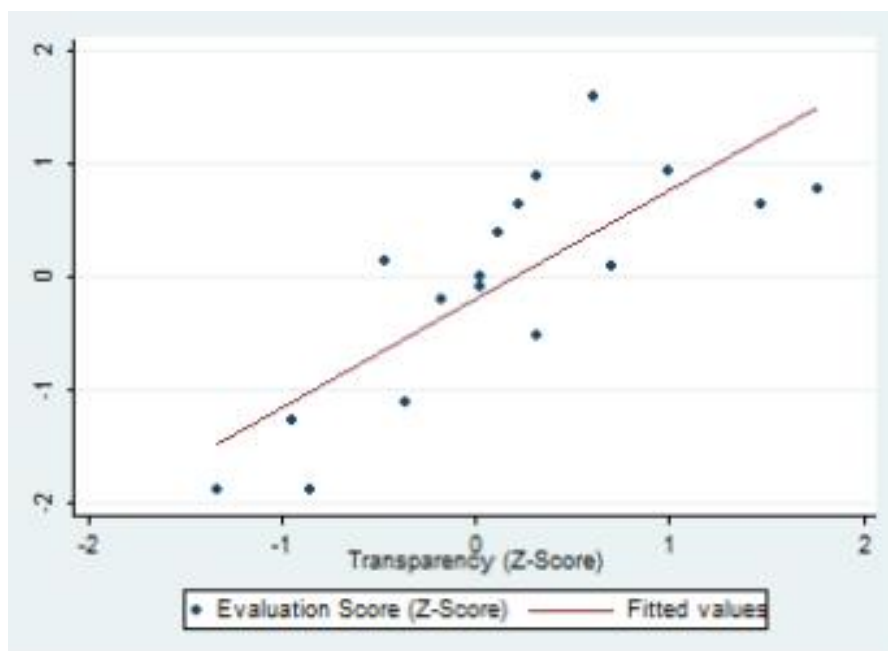


Figure 6. Dispersion and Fitted Line between the Total Score and Service Quality

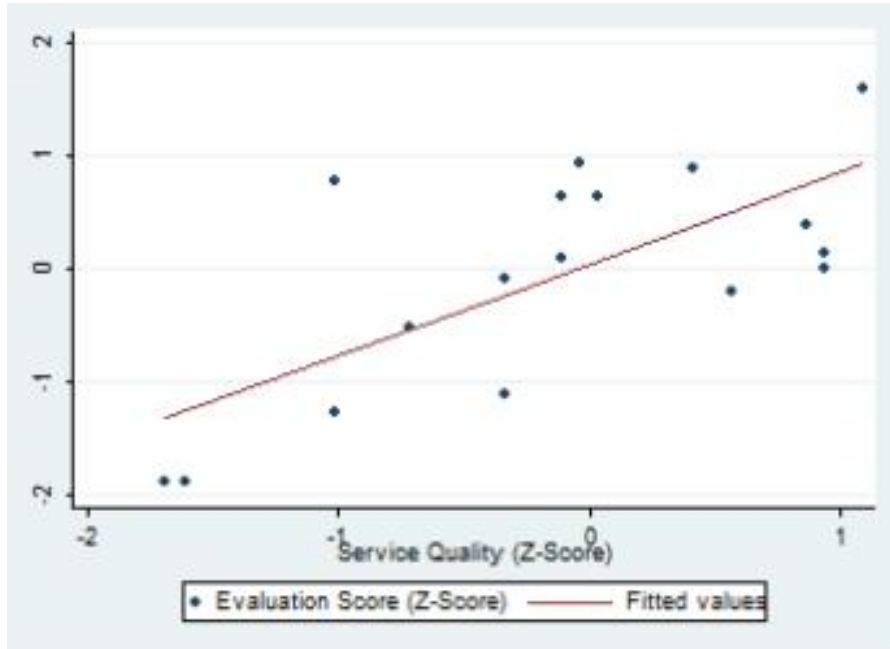
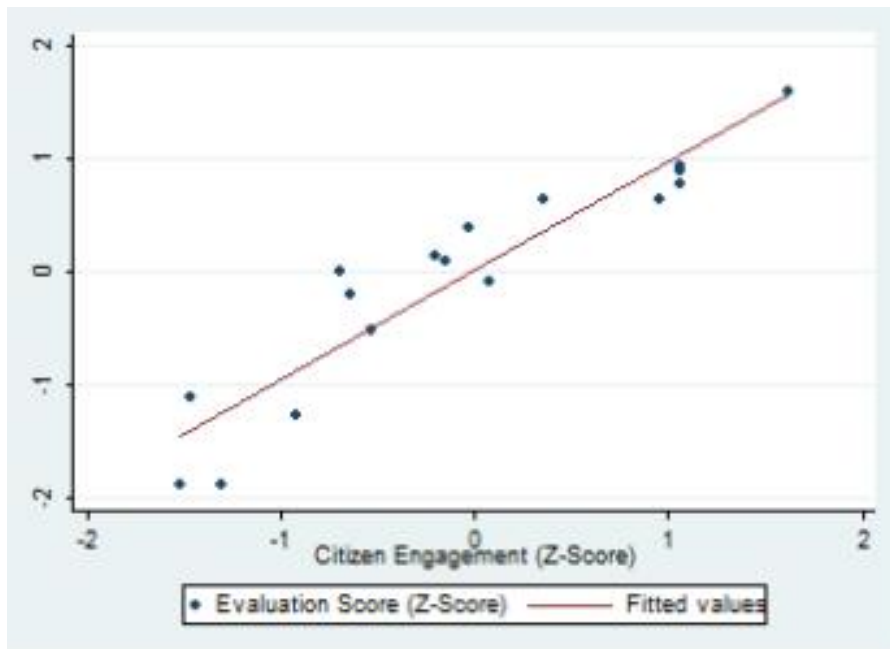


Figure 7. Dispersion and Fitted Line between the Total Score and Citizen Engagement



1.3. Impact of Transparency, Service Quality and Citizen Engagement on Each Other

A. Transparency

In Table 4, the coefficients of items in T-2 are more statistically significant than the coefficient of T-1, which implies that T-2 is more likely to be a meaningful determinant of the dimension score than T-1. As depicted in Table 3, the coefficient of ‘free of charge’ (T-1-3) is statistically significant. This brings an interesting point because Korean governments, since 2013, promoted open government initiatives as part of ‘Government 24’ that emphasized openness, sharing, communication, and collaboration. In the meantime, as we traced back to municipal government websites with low scores in T-1-3, we found the practice of charging fees for information sharing was actually upon the regulation of the national government information website⁶: “the national information sharing portal indicates that when disclosing information through an information and communication system, the fee for electronic file duplication is applied.”

Each coefficient of items in T-2, such as public service standards (T-2-1), publications of council reports and performance (T-2-3), and ethical commission (T-2-5) were positive and significantly different from 0, but they were not statistically significant when CE was controlled. In other words, the effect of T criteria on the total score was not robust. Through a close observation, we found that such contents were produced by the local councils, and those municipal government websites with low score in these items tended not to provide the information of the local council websites. Although both organizations serve different functions in public affairs, in the citizens’ perspective, the close alignment between these digital platforms is crucial in terms of convenience and perception of transparency in government. Particularly, in terms of democratic e-governance, public organizations are required to provide easier access to not only public information and service, but also political processes and choices.

⁶ <https://www.open.go.kr/pa/info/openInst/chargeInfo.do>

Table 4. Regression Results: Transparency

	(1)	(2)	(3)	(4)
Variable	Total Score	T Score		
T-1-1	-0.054 (0.102)	0.025 (0.040)	-0.006 (0.037)	-0.046 (0.087)
T-1-2	-0.062 (0.197)	-0.040 (0.069)	0.061 (0.043)	0.033 (0.150)
T-1-3	0.349* (0.174)	0.105 (0.162)	0.090 (0.053)	0.505** (0.182)
T-1-4	-0.143* (0.073)	0.082* (0.041)	0.062** (0.027)	0.016 (0.085)
T-1-5	-0.121 (0.193)	0.108 (0.066)	0.026 (0.039)	-0.015 (0.165)
SQ	0.689** (0.278)		0.404*** (0.070)	
CE		0.921*** (0.111)	0.794*** (0.062)	
Constant	0.041 (0.178)	0.026 (0.097)	0.066 (0.047)	0.159 (0.201)
R-squared	0.648	0.904	0.979	0.381
T-2-1	0.603*** (0.144)	-0.254 (0.211)	0.083* (0.038)	0.316** (0.120)
T-2-2	0.232 (0.176)	-0.089 (0.358)	-0.009 (0.051)	0.047 (0.225)
T-2-3	0.265** (0.106)	0.102 (0.232)	0.175*** (0.030)	0.532** (0.179)
T-2-4	-0.015 (0.185)	0.097 (0.209)	0.000 (0.061)	0.048 (0.162)
T-2-5	0.344** (0.112)	-0.059 (0.155)	0.099** (0.037)	0.331*** (0.101)
T-2-6	0.177 (0.226)	0.123 (0.170)	0.142*** (0.031)	0.435*** (0.113)
SQ	0.758*** (0.093)		0.468*** (0.036)	
CE		0.984*** (0.188)	0.613*** (0.037)	
Constant	-0.066 (0.106)	0.031 (0.084)	0.025 (0.034)	0.034 (0.081)
R-squared	0.901	0.903	0.995	0.906

Robust standard errors in parentheses

All dependent variables and explanatory variables are the z-score.

X*** p<0.01, ** p<0.05, * p<0.1

B. Service Quality

Service Quality dimension consists of two sections, interoperability (S-1) and credibility (S-2), which contains detailed items. Especially, visual element (S-1-4) and processing capacity (S-1-5) consist of more specific items. Table 5 shows the regression results. The first panel shows the estimated coefficient of Interoperability (S-1-1~3) where accuracy, navigational structure, and content organization are included. Neither of the estimated coefficients was significantly different from zero. The other panels show that estimated coefficients of elements (S-1-4), Processing capacity (S-1-5), and Credibility (S-2) were statistically significant. Specifically, coefficient of website performance at low resolutions (S-1-4-2), page loading time (S-1-5-1), privacy (S-2-3) were positive and statistically significant. For example, 1 standard deviation increase in ‘Website performance at low resolutions’ was associated with 0.27 standard deviation of total evaluation score, or 0.56 standard deviation service quality evaluation.

Table 5. Regression Results: Service Quality

Variable	(1) Total Score	(2) SQ Score	(3)	(4)
S-1-1	-0.029 (0.178)	0.003 (0.048)	0.017 (0.052)	-0.003 (0.131)
S-1-2	0.222 (0.135)	0.069 (0.105)	0.084 (0.109)	0.273 (0.215)
S-1-3	0.235* (0.129)	0.107 (0.110)	0.118 (0.113)	0.342 (0.207)
T	0.832*** (0.151)		0.292** (0.131)	
CE		0.897*** (0.094)	0.708*** (0.137)	
Constant	-0.130 (0.134)	0.031 (0.093)	-0.022 (0.095)	-0.074 (0.196)
R-squared	0.735	0.886	0.911	0.299
S-1-4-1	0.202 (0.112)	0.020 (0.075)	0.043 (0.072)	0.176 (0.133)
S-1-4-2	0.269**	0.230***	0.230***	0.559***

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	(0.096)	(0.052)	(0.046)	(0.101)
S-1-4-3	-0.143	0.177***	0.101	0.141
	(0.105)	(0.056)	(0.062)	(0.107)
S-1-4-4	0.121	0.161*	0.139	0.327**
	(0.109)	(0.085)	(0.077)	(0.145)
S-1-4-5	0.294**	0.026	0.102	0.304**
	(0.113)	(0.060)	(0.072)	(0.112)
T	0.858***		0.238*	
	(0.146)		(0.114)	
CE		0.895***	0.706***	
		(0.079)	(0.112)	
Constant	-0.118	0.051	0.007	-0.029
	(0.102)	(0.055)	(0.057)	(0.109)
R-squared	0.908	0.971	0.979	0.829
S-1-5-1	0.219	0.127	0.135**	0.353***
	(0.161)	(0.077)	(0.046)	(0.105)
S-1-5-2	0.233	0.101	0.109	0.314**
	(0.158)	(0.085)	(0.066)	(0.128)
T	0.823***		0.287*	
	(0.159)		(0.155)	
CE		0.872***	0.687***	
		(0.096)	(0.085)	
Constant	-0.136	0.032	-0.022	-0.077
	(0.138)	(0.080)	(0.082)	(0.165)
R-squared	0.753	0.900	0.924	0.416
S-2-1	0.265***	-0.118**	0.034	-0.090
	(0.077)	(0.041)	(0.068)	(0.110)
S-2-2	0.178	0.209*	0.203**	0.448
	(0.103)	(0.115)	(0.069)	(0.304)
S-2-3	0.416***	0.066*	0.209**	0.308***
	(0.125)	(0.035)	(0.084)	(0.068)
T	1.335***		0.497**	
	(0.199)		(0.193)	
CE		0.975***	0.701***	
		(0.084)	(0.116)	
Constant	-0.221*	0.031	-0.056	-0.103
	(0.123)	(0.080)	(0.066)	(0.186)
R-squared	0.802	0.920	0.955	0.354

Robust standard errors in parentheses

All dependent variables and explanatory variables are the z-score.

X*** p<0.01, ** p<0.05, * p<0.1

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C. Citizen Engagement

Some coefficients of items for CE were statistically significant. In detail, each coefficient of items in C-2 (Dialog) and C-4 (Collaboration) was positive and significantly different from zero. In terms of Dialog, estimated coefficients of Announcement (C-2-1), Tools for making comment and discussion (C-2-4), SNS/Smartphone application (C-2-5), and Direct communication with mayor or council members (C-2-6) were statistically significant. In terms of Collaboration (C-4), coefficients of sharing the products and outcomes created through collaboration (C-4-2), live broadcasting of meetings (C-4-4), and tools for collaboration (C-4-5) were positive and statistically significant (see Table 6).

The use of website provided users with fun, exciting, and pleasant experience on all local government websites, as the average score of emotional appeal was 4.94 (SD=0.17). However, websites with high dimensional scores were likely to have high scores of dialog and collaboration; all items in dialog variable showed high standard deviations, which could work as determinants of the dimension score (see Table 2). For instance, one standard deviation increase of SNS/smartphone application led to a 0.439 standard deviation increase in dimensional score.

Table 6. Regression Results: Citizen Engagement

Variable	(1) Total Score	(2) CE Score	(3)	(4)
C-2-1	0.351*** (0.085)	0.322*** (0.069)	0.184*** (0.045)	0.376*** (0.060)
C-2-3	0.167 (0.133)	0.258** (0.095)	0.096 (0.054)	0.242** (0.086)
C-2-4	0.290 (0.164)	0.310** (0.101)	0.199** (0.078)	0.393*** (0.114)
C-2-5	0.400*** (0.121)	0.395*** (0.104)	0.207*** (0.051)	0.439*** (0.075)
C-2-6	0.315*** (0.073)	0.296*** (0.079)	0.237*** (0.053)	0.433*** (0.095)
T	0.345		0.462***	

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	(0.214)		(0.095)	
SQ		0.371***	0.432***	
		(0.111)	(0.058)	
Constant	-0.120	-0.018	-0.073	-0.095
	(0.110)	(0.085)	(0.065)	(0.090)
R-squared	0.870	0.913	0.967	0.883
C-3-1	0.059	0.225	0.103	0.282
	(0.200)	(0.246)	(0.134)	(0.306)
C-3-2	-0.003	0.107	-0.070	0.093
	(0.179)	(0.172)	(0.127)	(0.172)
C-3-3	0.250*	-0.065	0.088	0.067
	(0.136)	(0.146)	(0.113)	(0.177)
C-3-4	0.321	0.354	0.125	0.539**
	(0.188)	(0.205)	(0.155)	(0.227)
T	0.855***		0.776***	
	(0.204)		(0.165)	
SQ		0.596***	0.518***	
		(0.176)	(0.117)	
Constant	-0.140	0.071	-0.079	-0.008
	(0.153)	(0.141)	(0.105)	(0.184)
R-squared	0.766	0.697	0.907	0.462
C-4-1	0.238**	0.170	0.125*	0.250
	(0.088)	(0.150)	(0.064)	(0.155)
C-4-2	0.191	0.483**	0.187**	0.552***
	(0.152)	(0.171)	(0.071)	(0.145)
C-4-3	-0.167	-0.135	0.028	-0.079
	(0.152)	(0.191)	(0.130)	(0.164)
C-4-4	0.577***	0.436*	0.293**	0.615**
	(0.118)	(0.229)	(0.098)	(0.201)
C-4-5	0.263	0.424**	0.130	0.453**
	(0.177)	(0.136)	(0.148)	(0.148)
T	0.601***		0.606***	
	(0.136)		(0.092)	
SQ		0.422	0.433***	
		(0.250)	(0.112)	
Constant	-0.052	0.109	-0.047	0.041
	(0.111)	(0.154)	(0.081)	(0.157)
R-squared	0.902	0.809	0.951	0.754

Robust standard errors in parentheses

All dependent variables and explanatory variables are the z-score.

X*** p<0.01, ** p<0.05, * p<0.1

There are some suggestions on analyzing regression results. It does not mean that focusing on only these significant criteria guarantees higher evaluation scores. Criteria where estimated coefficients are not significant are likely to be highly scored in most local government websites. Thus, it is recommended to interpret that local government websites in Korea can be better improved by refinement in terms of these criteria where the estimated coefficient is statistically significant.

2. Qualitative Investigation

Given the findings from the evaluation of websites, we came across additional inquiries about the organizational background and experiences of municipal governments in terms of e-government programs, as well as the need for examples that show how their websites served as digital participatory platforms to co-create public value. At first, we reached out public officials of all 17 local governments who were in charge of their website or e-government policy, and we were able to arrange phone interviews with 15 public officials for about 30 minutes to 1 hour in early August 2018. The phone interviews led to insightful conversations and provided important lessons from respondent practical experiences. However, due to the recent change of assignments as required by rotational assignment policy in public administration, the primary interviewees were not able to fully answer our inquiries. Thus, we collected further information through follow-up email communication with them around the middle of August 2018. At this stage, two of the corresponding interviewees from South Jeolla and Seoul metropolitan City governments responded with detailed answers in collaboration with additional public managers from various departments, such as website management, civil affairs, planning, budgeting, organization, and statistics. After all, we gathered abundant qualitative data from the initial 15 phone interviews and two follow-up discussions via email. As the contents of two follow-up discussions with public managers from the Seoul metropolitan city and South Jeolla government tended to cover and extend the data gathered from the initial 15 phone interviews, further in-depth interviews exclusively focused on those two cases.

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2.1. Organizational Background

Both government websites were established around the legislation of the E-Government Act (2001). Seoul metropolitan City opened its website in 2003 while the one for South Jeolla was built in 1997⁷. Corresponding to the argument in prior studies as well as our evaluation results, the organizational motivation for constructing their websites heavily lay on the provider's perspectives for technical elements and information publication. Respondents from Seoul metropolitan City (respondent A) stated that “we have paid attention to the effective, timely information publication, increased accessibility, and 24/7 system availability” regarding website design. Public officials from South Jeolla (respondent B) highlighted technical aspects such as adopting the state-of-the-art website features to enhance citizens' convenient experiences of using the website. Respondent B indicated the organizational strategies that included benchmarking other government websites and inviting consultants every year. In both governments, there are approximately 20 personnel who are assigned for website policy and operations across multiple divisions and departments to work with the website management as task force members. While the governments are in collaboration with the municipal councils regarding public affairs, little cooperation has taken place in terms of the management of each website, other than introducing links.

2.2. Democratic E-Governance in Practice

In terms of information publication through government websites, respondent A noted “at first, public officials tended to hesitate to disclose public documents, partly because they were not sure what is to be kept and to be released”. In the early stage of the e-government initiative in Korea, a clear guideline for public information published through websites was not available; thus, public officials had to rely on their own reasoning and judgment regarding privacy and security related issues.

⁷ South Jeolla established its website before the enactment of the E-Government Act, based on its internal guideline. Upon the legal framework, it further improved its e-government services.

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Nevertheless, under the E-Government Act (2001) that legally obligated all government levels to disclose information, it was regarded as “a must do” according to respondent B. Consequently, both governments found that citizens could simultaneously access a wide range of government information in a shorter time and that public administration was more transparent, impartial, and accountable. In the meantime, respondent A stated “once the information is published on the website, though it is effective to share, it is difficult to correct the information when necessary”. This implied the aspects of the limited roles of one-way communication on government websites. Moreover, online information disclosure, accompanied with information preparation and upload, increased the workload, respondent B noted. It was argued that online information publication would promote efficiency by reducing the number of information request cases that public officials deal with; however, this sounded like a tricky situation. The background of this answer, whether there were technically or organizationally inefficient settings on the procedure, or whether citizens' demand for information actually rather increased, needed further scrutiny to find solutions for narrowing the gap between expected impact and practical experience.

Public services provided on government websites were faster and more convenient, as both respondents voiced. Although there were no available statistics, respondent B estimated 30% of public services were delivered through the website. On the other hand, respondent A noted that its government would provide new public e-services that were timely and relevant to the needs of the changing society amid the 4th industrial revolution (e.g., Smart City). However, “financial and organizational capacities must be accompanied to maintain the timeliness of public service contents”, respondent A said.

For citizen engagement, they prepared relevant tools on their website, aimed to identify the types and the nature of public services that citizens want. Respondent A mentioned that its government intended to allow citizens to play active roles in deliberating, discussing, making decisions, and

implementing public affairs. In fact, they both witnessed that it was more accessible, more efficient, and freer for citizens to participate on government websites. Respondent B stated “citizens seemed more confident and honest with sharing their thoughts and opinions online, as they are not actually facing the public officials in person”.

However, they both noted the difficulty in managing the increased interactions and in validating the actual needs of the public out. The difficulty was in not creating only what appealed to a small portion of the public and not to automatically reflect the opinion of a few or an individual as the collected opinions of the public. Also, respondent A noted “while a simple survey is easily taken, citizens tend to avoid engaging in complicated issues, and even if they do, it is rare to provide useful, quality solutions for problems that require in-depth consideration.” In addition, both respondents answered that their governments faced citizen low interest in engaging, mainly because of a lack of publicity. Particularly, respondent B mentioned South Jeolla government continued to deal with the aging population and the possible element of the digital divide, in order to promote their inclusion. Regarding, South Jeolla government was consulted to improve Internet access for citizens and the Seoul government annually conducted the survey on information access and quality certification. Furthermore, in order to encourage participation, they both use Email, SNS, and push functions on mobile applications. Respondent A introduced the incentive system on the page of sharing policy proposals that provided participation mileages to citizens who received a high voting number, and that presents as mobile coupons by lottery. Following, we discuss various types of citizen engagement, including sharing policy proposal, policy forum/discussion, and collaboration.

A. Sharing Policy Proposals

One of the common tools for citizen engagement in local government websites is ‘sharing policy proposal’, in which citizens freely write about their ideas of policies that are considered important. Regarding the level of citizens’ willingness to share policy ideas, respondent B noted they have not

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conducted such a survey, but assumed it steady as the yearly page visit rates did not have a big difference. Respondent A also stated “it is not known the overall willingness of citizens to participate, but it is certain that those citizens who participated in sharing policy proposal showed great interest in engaging again later”.

In both governments there is an internal process of reviewing and following up these proposals, in which various subjects are categorized into relevant departments, and public officials who are in charge of relevant tasks are responsible to follow up by replying whether such a proposal is relevant and can or cannot be applied into public actions. Furthermore, the accepted proposals, respondent A explained, were reviewed by the implementation committee, which consisted of a group of citizens, public officials, and experts, in order to examine not only the feasibility in detail, but also the elaborated strategies for effective implementation. The outcomes of the second review are published as feasibility reports on the government website. Regarding the proposals of feasibility reports, another open discussion takes place, and the citizens decide whether the proposals can be implemented via online voting. Once a proposed policy is implemented, citizens can check the processes and outcomes on the website. Until recently, the Seoul metropolitan City had collected 1,708 proposals from citizens, and implemented 76%.

On the other hand, respondent B shared the external and internal issues on sharing policy proposals. The proposed policy ideas tended to overlap the existing public programs under consideration within the local government. And public officials tended to take passive attitudes towards the system as it could potentially increase workloads and the limited budget could not cover the amount of the financial rewards given to the accepted proposals.

B. Policy Forum/Discussion

Citizens can be involved in the deliberation and appraisal of policy ideas through an online policy forum/discussion tool. Agendas, to be included in the citizen-involved policy discussion, are set by

individual public officials upon the internal approval, sometimes based on the consultations of expert committees, respondent B noted. Respondent A stated that socially pending issues as well as citizens' suggestion/complaints were mainly reflected. Respondent A also mentioned that the online policy forum/discussion had been useful for transitory collections of citizens' preferences using simple tools for 'accept/reject' or 'like/dislike', but limited to deal with complicated cases that required in-depth examinations and informed judgment by various stakeholders. Furthermore, respondent B added that due to the limited financial and organizational capacities, the plans decided by the policy forum could not be implemented immediately, often postponed, and consequently considered as one of redundant formality.

C. Collaboration

It is believed that government websites can serve as a digital platform that enables government-citizen collaboration. Participatory budgeting program, in which citizens can engage in deliberation and decision-making about how to allocate part of a public budget, is one good example that numerous citizens can avail themselves of through government websites in both governments. However, both respondents noted that it did not always bring about effective outcomes. While as respondent A stated, collaboration on the public issues that necessitated the support of citizens were suitable for such collaboration, respondent B added that working with civic groups often faced a lack of understanding of the issue and limited willingness to invest more time and responsibilities, as their involvement usually brought about benefits for all, not particularly for themselves. For example, "when there is a chance for participants to use their idea for more direct interests of themselves, such as publications or business, it is unlikely they openly share it while collaborating with the government", respondent B noted. Despite these unresolved challenges, both governments co-produced successful public outcomes through working with the citizens. The next section presents two examples of each government in detail.

2.3.Examples of Public Value Co-Creation through Democratic E-Governance

During the interviews, the respondents provided two cases of public value co-creation through collaboration on government websites.

A. The Ondol for Hope Project in Seoul Metropolitan City

The Ondol for Hope Project (below Ondol project) is a public-private partnership to help neighbors in need in local communities through voluntary participation, donations of civic groups, entrepreneurs, and citizens. The background of this project was that the legal and institutional framework of the Seoul municipal government did not properly meet welfare demand on the ground, leaving more than 290,000 people without public welfare assistance (Seoul Solution, 2014). The diverging gaps within the city, together with income inequality, were considered an obstacle for social integration. Moreover, the financial burden of the social welfare budget that increased from 16.1% to 25.9% between 2007 and 2012 necessitated the need for the private sector to take a bigger role.

This project was first launched as an immediate measure for alienated citizens in the winter of 2011 when the temperature plummeted particularly earlier than usual. Civic Planning Council was initially formed to gather citizens' voices and the information of districts in welfare blind spots, and named this project after the Ondol, the Korean underfloor heating system, which symbolized the goals of the project to provide a warm housing environment. The council developed a website called the Hope Ondol Community Map, to collaborate with members of a network of 122 local institutions and 3,171 private organizations that worked on this project. The network of district welfare institutions and local civic organizations was pivotal to respond to local situations quickly and efficiently by mobilizing resources. In addition, the participation of 659 local citizens, including local grocery store owners, staple food stores, and merchants in traditional markets, represent the standing at the forefront of social welfare. The local citizens identified people in need and communicated with district offices or welfare facilities for immediate relief efforts. In the meantime, the city of Seoul formed a task force,

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with members from 10 divisions of welfare, housing, employment and healthcare, which consisted of ten units handling specific tasks such as general control, the poor, the homeless, emergency healthcare, hope sharing, urgent repairs, IT support, and fraud prevention.

Participants of the Ondol project, both public officials of the Seoul municipal government and civic members, communicate and collaborate on its website, namely Hope Ondol, aligned with the Seoul municipal government website. This website provides the information of people in need and participating organizations or entrepreneurs and functions to manage applications for participation. While the Seoul government manages website system, all participants can add local knowledge of the need maps, and share the outcomes of the project. For example, the distribution of supplies and assistances takes place based on the community map that shows the location of people in need and donating agencies, which is continuously updated through the participatory community mapping practice by combining public data, provided by the local government, with local information input by local residents. Also, citizens can share experiences of participating in this project by uploading photos and essays.

In the meantime, the development of a public-private partnered project, through online platforms, has allowed for the process of overcoming challenges. First, it was necessary to create the culture of symmetric partnership between the government and citizens. The conventional paradigm that a government as a provider and citizens as recipients of public service prevailed at first among public officials, which led to distrust in and concerns about a new form of relationship. Moreover, numerous civic organizations and participants were wary of each other, particularly among private organizations. Second, the initial tensions between the government officials and civic members, as well as among civic organizations, gradually resolved through the participatory planning and implementation of the project. The Civic Planning Council, which mainly consists of civilians, made the initial important decisions concerning the scope and the strategies of the project, and promoted the Ondol Project in

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their local community, calling for participation. In addition, the city of Seoul launched various public campaigns, under the slogan, “No one go to bed hungry or cold under Seoul’s sky”, and awarded civil contributors every year, in order to encourage citizen support for and participation in this project.

Gradually, the consortium-based project led to a buildup of confidence in such collaboration and to successful outcomes. The Ondol project started with 215 organizations, promoting 29 projects in 2011, and continued to grow with 3,883 participating groups, assisting 290,000 people in need within one year. In the same year, for the first time in the city’s history, no homeless person froze to death. Following its remarkable success, the project became year-round, and the management of the project was enhanced by setting up an educational and training program for participants to enhance their service capabilities and fundraising skills in June 2012. The public-private collaborative project has continued to this day with the increased participation, and as of 2017, the total civic donation has amounted to USD 90 million.

The successful outcomes of the Ondol project suggested insights on how the focus on legal and institutional welfare solutions shifted towards the actual needs of the citizens and how the public-private collaboration provided customized welfare projects suited to local circumstances, which eventually led to the welfare administration reform in Seoul municipal government. Moreover, the project proved that citizens could play significant roles in resolving community issues, and that public officials witnessed achievement intensified through working with civic organizations, entrepreneurs, and individual citizens.

B. South Jeolla in the Forest Project

The South Jeolla province has abundant forestry accounting for 11% of the national forest area, but the municipal government has recognized that its value is not fully realized. For example, the forest management focused on the number of trees, regardless of the aspects of scenery, and the linkage between the forest and the residential area was not built, which prevented citizens from

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appreciating benefits from it in their daily lives. Moreover, while 84% of the forest is private property, the owners are not willing to invest in upgrading the forest lands due to its difficulty to collect a return on investment immediately because it takes at least 20 years to have income after planting.

In this context, the South Jeolla government drafted a project, namely ‘South Jeolla in the Forest’ in 2015, and held a public policy forum on its website. Led by the Forest Industry Department of the municipal government, the policy forum took place online during the period of October 18-31, 2015, on ways to encourage citizen engagement in this project. The ideas shared by citizens included citizen-led campaigns, increased chances for students to experience forest as part of their curriculum, promotion of entrepreneurs’ contributions, and transformation of vacant land into green spaces. Reflecting the outcomes of policy forum, the municipal government created a 10-Year Plan of South Jeolla in the Forest (2015-2024).

The 10-Year Plan indicated that the municipal government would invest KRW 530 billion (USD 480 million), together with the Korea Forest Service and city governments in its province, for planting trees on 31,000 hectares, roadside trees by 1,180km, creating 110 parks in vacant spaces, 170 parks in schools, and 250 parks in residential areas. Furthermore, South Jeolla in the Forest Corporation was established in July 1, 2015, which consisted of civic organizations and experts, to promote the citizen-led project implementation and awareness campaigns and discussions. Also, "Civil Council for South Jeolla in the Forest" comprised of 252 citizens in the municipality to provide consultation, technical assistances, and program development. To regulate the implementation of this plan, the “Bylaw for Supporting Tree Planting” was enacted in August 5, 2015. As a result, in the first year after initiation, 107,000 citizens participated in planting 7.6 million trees.

One good example of participatory implementation was the ‘green wall building project’ in the Gwangyang city of South Jeolla in 2015. The green wall project was to plant vines on the road side walls for 750 meters to absorb CO₂ and air pollutants and to create aesthetic scenery in the city. It

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was a public-private collaboration of 650 participants from the Gwangyang city government, civic organizations, entrepreneurs, and local residents. The members of this project discussed a plan to continue building the green walls for 20 thousand meters by 2018 and considered the management strategies of the green wall.

In 2016, the South Jeolla municipal government held another policy forum on this project to encourage the public-private collaboration on its website further. The South Jeolla municipal government prepared a page for this project on its website⁸ in order to share the implementation progress and outcomes. On the other hand, the practical administration of the project such as collecting citizens' proposal and applications was handled at the city government levels.

The South Jeolla in the Forest project was planned through policy deliberation with citizens on its municipal websites, and implemented in collaboration with citizens. As a result, the project so far generated not only bigger and more beautiful green spaces in the province, enhancing the quality of life of its citizens, but also created a culture of a public-private partnership for achieving public goods.

2.4.Future Expectations

We asked questions about new tools that could facilitate the democratic use of government websites, and roles of local government websites differentiated from the national government website. Respondent B stated that new tools that facilitated two-way communications and notified the successful arrival of the information published on the websites could improve asymmetric practices. Moreover, functions that allowed communicating with citizens who opened or downloaded the documents could improve communication for correction of the information that was already published when needed. To increase responsiveness to citizens' complaints or comments, both governments provided other digital platforms in association with their government websites, such as

⁸ <http://brand.jeonnam.go.kr/contentsView.do?menuId=brand0201000000>

SNS and mobile applications. However, they both voiced the interoperability between these channels and media should be improved.

Regarding the differences between local government websites and the national government website, they argued that the roles and functions of each website were highly associated with the administrative structure that characterized the boundary of the administrative functions of different government levels. However, respondent B stated that in Korea, local governments' functions had not been developed into differentiated area, compared to the national government, except working on the local level, thus, local government websites did not need to be designed differently. Respondent A also noted each level of government was equally required to publish information and to provide services in relation to their own functions. However, strategic coordination and collaboration between the national and local government websites could be further enhanced.

DISCUSSION AND IMPLICATIONS

Prior studies paid limited attention to the local governments' e-government practices, despite significant roles in democratic e-governance. As such, numerous scholars studied the national government's performance in implementing the e-government programs of Korea, but the level of development of e-governance at the local level was unexplored. Moreover, the existing e-government research emphasized administrative goals of this new system to include efficiency in information publication and delivery of public services, and no proper account was taken for its ultimate purposes, the public value creation. Thus, filling these gaps of the current state of the research will help find strategies to create the tangible impact in digital government context.

In this study, we analyzed the municipal government websites in Korea, in order to examine how promoting democratic e-governance at the local level facilitated public value co-creation. We exploited a mixed method that combined a quantitative analysis of website evaluation scores with

qualitative analyses and included observations of the websites and interviews with public managers, in order to obtain a deeper understanding. Our findings implied that the overall local level of e-government practices was behind the national government's performance, but a few local governments outperformed in terms of democratic e-governance. Local government websites tended to be well equipped with the basic condition of information sharing, while less prepared in terms of more sophisticated criteria, including public e-service and citizen engagement. In addition, the interviews provided the organizational and practical backgrounds, as well as the ways in which public value can be co-created through the use of websites. In the following, we discuss theoretical insights and policy implications of this study.

1. Theoretical Implications

Our study provides three meaningful insights for existing theories and scholarly works. First, linking theories of public value creation and democratic e-governance, we provided an interactive view of how the government and citizens could co-produce public outcomes. We probed into the ways in which these two branches of theories, which hitherto had been developed separately, could complement each other to show a more complete picture of the new public governance strategy. In particular, we presented two examples of public value co-creation through the use of the municipal websites, which depicted the specific process of planning and implementing the public programs, the level of citizen involvement, and the roles of government websites in facilitating the collaboration. In this way, our findings substantiated the hypothesis of public value co-creation through democratic e-governance, implying the possibility of theoretical integration to further develop research in public administration.

Second, our statistical analyses of municipal government website evaluation scores possibly corresponded with implications of e-government stage model. Scholars (Layne & Lee, 2001; Lee, 2010; Janowski, 2015) claimed that e-government programs developed gradually, started from online

information presentation (one-way communication), the transformation of public services in electronic systems (two-separate-way communication), to citizen engagement (interactive communication), yet its empirical validation was underdeveloped (Coursey & Norris 2008; Klievink & Janssen, 2009; Rooks, Matzat, & Sadowski, 2017). While we did not intend to empirically test this model through a linear analysis, our result showed a present evidence of municipal e-government practices that were highly developed in basic conditions, such as information publication, while less developed in complex functions, such as citizen engagement.

Third, our study brought an inspiring view of local governments' roles in promoting public value co-creation in the e-government context. While the literature on decentralization in democratic societies emphasized the important positions of local government not only for efficiency but also for democratic legitimacy, e-government studies, while emphasizing the importance of citizen engagement, paid limited attention to examining its practices at the local level. Although technologies can resolve physical limitations of commissioning mass communication, the local government's role remains pivotal, as the citizens can participate more easily at the local level, regarding public issues that are mostly context-dependent. In this respect, we provided tangible, deeper understanding of e-government circumstances at the local level, by revealing both potentials and challenges.

2. Policy Implications

Our findings suggest important policy implications for both prospects and challenges of the future governance in the following ways. First, this study described the specific process of co-production in the local e-government context, providing practical policy references for managing the process of public value co-creation and improving website design. It is often challenging for public managers to work with civic organizations, entrepreneurs, and residents, due to a lack of clear guidelines and protocols to manage such collaboration. Our findings showed the possibility of generating greater public outcomes through collaboration, in which public interests and supports were effectively raised

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by civic participants' publicity activities, to mobilize abundant resources from private sectors. In addition, our evidence depicted the ways in which a local government and other civic stakeholder co-produced through communications on government websites. Moreover, public managers could consult the website features for democratic e-governance, presented in this study, to improve websites not only to create a more welcoming environment for citizen engagement, but also to manage communication and collaboration with citizens effectively. In this way, our study provides public managers with practical references for promoting public value co-creation through their websites.

Second, our study also suggests underlying challenges that public managers may face while promoting such participatory practices and provides recommendations. For example, our conversations with public managers revealed that low participation rate and lack of public understanding of complicated public affairs could hamper more effective public value co-creation. When the citizens' participation rate is low, it is possible that public activities may be shaped for a small group of citizens, rather than for the entire population. This also relates to the issues of a lack of public awareness of this opportunity to engage, as well as the digital divide, deriving from digital exclusion and low digital literacy. Thus, public managers should not only effectively encourage public participation to ensure democratic outcomes, but also take public actions to improve digital literacy of digitally alienated group of citizens, such as public education programs and the combination of online and offline opportunities for citizen engagement.

Moreover, while collecting public preferences on simple issues through survey is effective; collaborating on complicated issues is likely to cause inefficiency, due to their lack of interest, understanding, and willingness to invest their time and resources. While the application of this issue may vary from country to country depending on the maturity level of citizenship, it implies the need for public managers to use the expert knowledge of public managers for professional policy analysis

wisely, together with local knowledge and collective intelligence of citizens (Dror, 1975). It requires a contextual analysis of public agendas to apply appropriate approaches.

Third, our discussions imply the need for tightly coordinating the e-government system among all government levels, in order to prevent inefficiency from duplicating and dispersing investments, creating citizens' confusions, and to overcome the limitations of organizational and financial capacities of local governments. Decentralizing e-government power and functions means there is a necessity of investment by local governments in such systems. However, our study found that local public managers experienced the increased workloads and financial limitations in facilitating democratic e-governance processes. Furthermore, the functions of the national government website and local government websites tended to differ mainly in terms of the administrative levels, instead of the kinds of functions. It is necessary for all government levels to coordinate to create efficient and effective democratic e-governance. As various kinds of public value relates to each other implying multilayered objectives, e-government systems of all government organizations must take interoperability of systems into account, in order to effectively co-create the public value.

3. Limitations and Future Research Directions

This research provided comprehensive evidence of the emerging idea, through a mixed method integrating a quantitative approach with statistical analysis of the evaluation scores and qualitative analyses of observations and interviews. However, it is at the exploratory level through an in-depth investigation of a case, so limitations associated with external validation and generalizability (Willis, 2014) apply to this study. Pertaining to these issues, we suggest the following research directions.

First, further research on the measurements of democratic e-governance and public value might help the empirical testing for building a model of public value co-creation through democratic e-governance. Due to the absence of available tools, we developed a theoretical groundwork and the website evaluation framework from conceptual analyses, yet these are not the outcome of

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quantitatively testing. To replicate and extend the research for building a theory or model, it is necessary to develop the measurements of democratic e-governance and public value.

Second, the ways of resolving latent challenges in promoting co-production in the digital government, which we identified in this research, can be further studied. Our findings not only introduced successful ways of co-production through government websites, but also revealed issues that public managers faced in the process, such as low citizen participation and lack of understanding of complicated public affairs, implying an extensive area of further research. The inquiries may involve how to combine professionalism in the public sector with participatory governance, what are the organizational and contextual determinants of successful co-production, and how e-participation can ensure democratic authentication in collective decision-making, as a low participation rate can result in reflecting only a few citizens' preferences.

Lastly, this study focused on public value co-creation within public administration at the local level, but citizen engagement in the political process was explored limitedly. In light of democratic e-governance, not only the administrative organization, but also the governing body, such as a local council, can collaborate with citizens to co-create public value. In fact, the local council is the highest authority over all administrative affairs in the region because it creates legal mechanisms for public value creation. Although the local council is comprised of members elected by the citizens, it is also important that it continues to collect citizens' ideas and preferences in the digital government context. Studies on how citizens can engage in the process of the local council's activities, as well as how local government can work with the local council for democratic e-governance, are rare. In this context, additional research on public value co-creation in digital governance perspectives that extend from public administration to the analysis of the local council can provide significant insights into this field of study.

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