E-Government in U.S. Cities: Enabling Engagement or Reinforcing Tradition

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THESIS
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DEDICATION

This dissertation is dedicated to my loving husband, Victor. I appreciate your encouragement, patience, and loving sacrifice beyond measure.

To my extraordinary son, Evan. Your inquisitive mind, pensive nature, and loving spirit set you apart. With prayer and persistence, you can achieve anything.

To my dear aunt Joyce, a mother to me on earth and now my angel in heaven. You taught me well and will forever be my "lighthouse".

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SUMMARY

This study examines of the predictors of e-participation adoption among U.S. municipalities using a cross-sectional approach. This research draws heavily on survey data from department managers in approximately 429 U.S. municipalities. Survey responses included information about the technologies used and the purpose for which they are used, perceptions of influence on the department, and perceived outcomes related to technology use. In addition, the municipal websites were coded to identify features that enable website accessibility and usability. The predictors of e-participation were grouped into three categories based on the theoretical framework including organizational factors, institutional factors, and environmental factors. All data were included in a model predicting e-participation adoption by municipalities,

E-participation is measured as the sum of information and communication technologies used to enable or facilitate participation by citizens or external stakeholders. E-participation technologies are less frequently adopted, compared to service and communication technologies that facilitate less interaction with citizens. Organizational factors have the greatest influence on e-participation adoption. E-communication and e-services technology adoption are positively and statistically significantly associated with e-participation adoption. Managers' perceptions that technologies lead to greater decision-making outcomes is also positively associated with e-participation adoption. Some institutional factors also are important predictors of e-participation adoption. The normative institutional factor, the council-manager form of government, is negatively associated with adoption. That is, council-manager forms of government are less likely to adopt e-participation technologies while professional association membership is positively associated with adoption. Finally, there was no significant association with e-participation and environmental factors.

1. INTRODUCTION

Electronic government, or e-government, is about using electronic technology to enable

access to and interaction with government services. It involves the development of websites and

the implementation of information communication technologies (ICTs) that facilitate access,

communication, and interaction. An important promise of e-government is its potential to

transform government by providing new forms of access to and participation in the policy

process (Pavlichev & Garson, 2004). E-government can transform government by potentially

promoting greater engagement and democracy through the implementation of more sophisticated

ICTs that not only improve the ease of conducting business with government and improve

communication between citizens and their governments but also capacitate civic engagement and

participation. Levine (2007) defines civic engagement as behavior that influences public matters

to enhance the commons or to influence decisions about distribution and regulation of goods, and

may include participation in activities such as working with others to solve public problems,

contacting elected officials, and discussing public issues (p. 7). Civic engagement is an important

element of citizenship and good governance (Organization for Economic Cooperation and

Development, 2003). E-government can enhance engagement online through the implementation

of ICTs that improve citizens' access while reducing the time and costs associated with

traditional mechanisms of engagement (Ahn & Bretschneider, 2011) and may result in greater

transparency, trust in government, and more representative policies (Organization for Economic

Cooperation and Development, 2011). A 2010 study by the Pew Research Center reports that 48

percent of American internet users have looked for policy related information online with their

local, state, or federal government; and 23 percent reported participating in an online debate

about government policies (Smith, 2010). However, few studies have systematically examined

the technologies municipal governments use to facilitate engagement and the organizational contexts upon which such technology use by government is likely to occur. Accordingly, this research examines the adoption of e-government ICTs by municipal governments in the U.S. for the purpose of enabling civic engagement and participation.

1.1 Problem Statement

Since the early 2000s, scholars have been optimistic about the progression of e-government in the U.S., describing it as a process towards transformative e-government that begins with the implementation of ICTs that emphasize cataloging and information dissemination toward the implementation of ICTs that enable political participation. In his 2002 examination of U.S. municipal website adoption, Moon concludes that e-government is in its primitive stages, providing government information and mechanisms for two-way communication over the Web and that transformative e-government would be attainable in the near future. However, after nearly fifteen years of implementation, research, and evaluation, recent research suggests that U.S. municipalities have not yet achieved transformative e-government (Norris & Reddick, 2012). Although municipalities have adopted a greater number of ICTs and experience fewer barriers to technology adoption, the progression towards transformative e-government is incremental, with governments quickly adopting one-way communication and service ICTs, rather than those that promote two-way interaction and participation (Norris & Reddick, 2012, p.174).

Social Networking Sites (SNS) like Facebook, Twitter, and blogs have the potential to transform government because they enable networking, collaboration, and the inclusion of citizens in policy making processes (Mergel, 2013). Some scholars assert that these advanced ICTs can improve public service and engagement (Oliveira & Welch, 2013). However, despite

the widespread use of social media tools and sophisticated ICTs in U.S. society, government use of these technologies for transformative purposes has been slow and incremental. For example, in 2011, approximately 64 percent of Americans reported using social media (Duggan & Smith, 2013). In comparison, that same year a 2011 survey of U.S. local governments found that approximately 53 percent reported using e-government technologies that were primarily one-way communication with citizens while less than 16 percent reported using e-government technologies that were mostly transaction or interactive oriented (Norris & Reddick, 2012 p.170). In the same survey, approximately 97 percent of governments responded that they offered e-government applications and services in order to enable citizen access to local government information (International City/Council Management Association, 2011). Yet just 64 percent stated that they provided e-government in order to enable citizen participation in government (ICMA, 2011). This finding suggests that local governments do not always adopt e-government ICTs with the goal of promoting higher levels of civic engagement, as scholars initially hoped they might. The lack of adoption of transformative ICTs may also be the result of differences in the characteristics of ICTs such as the demands on human and technical capacity, the uncertainty of benefits or influences on organizational processes and structure, or perceptions of risk. Institutions, as mechanisms that mediate risks and uncertainties, can emerge as integral components of ICT adoption and use.

Fountain (2001) echoes this line of thinking, positing that institutions play an important role in e-government adoption and use in government. Organizations may implement new ICTs in ways that reproduce or strengthen institutionalized mechanisms even when that implementation of technology is neither rational nor optimal (Fountain, 2001, p. 90). Actors may use institutions to create stability and maintain power dynamics, rather than promoting change

and innovation (Fountain, 2001). This inertia, or resistance to change, is evident in the numerous barriers to e-government initiatives stemming from the internal and external environments of U.S. cities, including lack of financial resources, lack of technology and staff in the IT department, and staff reluctance to adopt new technologies and change work processes (Norris & Reddick, 2012). Furthermore, because of the complexities of technologies and the nuances among governments and their institutional environments, the nature of the relationship between government and technology use is not always obvious and uniform. ICTs change quickly and sometimes dramatically and U.S. local governments' internal and external environments are dynamic and diverse.

Based on this logic, we can assume that governments aim to adopt ICTs that promote higher, more sophisticated levels of democracy online, but face numerous barriers, such as political pressure or a lack of financing, capacity, will among government employees, or demand from citizens. These barriers or constraints may deter or prevent adoption. In their 2002 evaluation of U.S. state websites, Gant and Gant (2002) assert that the challenge for state governments is to overcome internal and external challenges in order to implement high functioning websites. Alternatively, some government leaders may have different intentions and understandings of engagement and democracy online. For example, a government may strategically implement ICTs that improve service delivery rather than those that facilitate open-ended citizen-to-government communication. In doing so, adoption reflects their perceived fit of the ICT with their intention for the use of that ICT (Cassell & Hoornbeek, 2010). It is also possible that ICT adoption influences future, higher-level adoption, where basic e-government services and programs lay the groundwork for offering advanced ICTs. This implies that ICT adoption alters organizational norms, processes, and capacities, reducing the perceived costs

associated with adoption of ICT that facilitate engagement. Therefore, this research seeks to understand and determining what explains the adoption of ICTs that foster civic participation, or e-participation.

Using local government survey data and data collected from a website content analysis, this research investigates municipal adoption of ICTs for promoting civic engagement. This research focuses on e-participation, defined as the use of ICT to support democratic decision-making (Macintosh, 2004). E-participation is characterized as government use of ICTs like web logging (blogs), chats, and discussion forums (Sanford & Rose, 2007), to enable citizen access to policy processes and decision-making.

This dissertation focuses on and distinguishes e-participation from e-services and e-communication, as three branches of e-government (Welch, 2012). E-service ICTs are defined as those that enable the electronic delivery of government services such as applying for licenses, paying fines and fees, and involve electronic transactions between government and citizens (Ahn, 2011; Gant & Gant, 2002). E-communication ICTs facilitate online communication between citizens and government and include one-way communications from government to citizens such as e-mail and newsletters, as well as simple two-way online interactions and dialogue between government and citizens (Ahn, 2011). E-participation, the focal ICT, is citizen-centered (Welch, 2012) and "supports democratic decision-making" (Medaglia, 2012, p. 346). E-participation promotes democracy by enabling communication and access to the policy process through informed decision-making and active participation in formal political processes (Saebo, Rose, & Flak, 2008). E-participation requires the participation of stakeholders, enabling the sharing of policy information, facilitating dialogue on important issues, and allowing citizens to influence decision-making. While both e-communication and e-participation ICTs can facilitate

two-way communication, e-participation ICTs are distinguished by an explicit intention to facilitate interaction between government and stakeholders.

Generally, engagement and participation in government policy making are desired in order to create better, more representative policies. ICTs may not create active citizens, or individuals actively engaged in defining the process and content of policy-making (Organization for Economic Cooperation and Development, 2003), nor are they a panacea for political and social issues (Wilhelm, 2000). However, e-participation ICTs provides new mechanisms for engagement while reinforcing representative democracy. E-participation ICTs may supplement rather than replace traditional engagement mechanisms such as face-to-face and written contact. In doing so, e-participation ICTs enable easier and broader access to government; provide relevant information; and facilitate openness and transparency in the policy process (Organization for Economic Cooperation and Development, 2003).

Most academic inquiry on e-government has focused on the progress and maturity of e-government, examining the extent of adoptions of e-government technologies. This dissertation takes a broader perspective, examining e-participation ICTs as access points to government decision making and policy building. In this view, ICTs enable citizens to move from being consumers of policy to producers of policy through participation in agenda setting and policy formation (Macintosh, Davenport, Malina, & Whyte, 2002). Therefore, variation in points of entry to policy and decision- making may signal unequal access to government and ultimately, unequal representation. This is particularly important in municipalities, the closest level of government to citizens and the level where citizen participation may have the greatest influence in government (Oates, 1972). Accordingly, I investigate the supply side factors, or the adoption

and provision of e-participation ICTs by U.S. municipalities, rather than the adoption or use of e-participation ICTs by citizen end-users that represent the demand side.

Much of the e-government literature focuses on large cities or cities within a state thereby ignoring the variation and institutional contexts within smaller municipalities and across states. This study addresses this gap in the e-government literature by examining the predictors of e-participation adoption within U.S. municipalities with populations of 25,000 to 250,000 and highlights the importance of technology as tools for facilitating engagement. The analysis can improve our understanding of the infrastructure needed to implement citizen-centered e-government and smart cities.

1.2 Research Questions and Design

The primary research question is *How do organizational, environmental, and institutional factors influence the adoption of e-participation ICTs among U.S. municipalities?* This research is rooted in Jane Fountain's Technology Enactment Framework (TEF) and Gil-Garcia's framework for e-government success (2012), which propose variance of ICT use based on three dimensions: organization, environment, and institutional. Insights from institutional theory also guide the research in identifying the determinants of their adoption. The model is further refined based on prior empirical studies that analyze technology adoption behavior. Therefore, I explore the extent of e-participation ICT adoption among U.S. municipalities in order to understand the present state of the research phenomenon. A related, sub-question is: *To what extent does differentiation in the functional roles of government influence the adoption of e-participation ICTs?* Municipal departments vary in their functional roles and their degree of interaction with the public. As a result, the adoption of e-participation ICTs may vary across functional roles or departments within a municipality.

E-service, e-communication, and e-participation ICTs each serve different purposes, and may require different specialized skills, and varied organizational capacity in order to successfully implement and manage them. However, e-participation, as compared to e-services and e-communication, is arguably associated with greater risk, higher transaction costs, and requires greater acceptance by users (Ahn & Bretschneider, 2011; Marques, 2010). Uncertainty and risks include whether expanding access to decision-making processes online will empower those traditionally marginalized by the political process, reinforce the influence of existing dominant actors (Resnick, 2002; Scott, 2006), or enable the domination of narrow, yet powerful pockets of the population. Similarly, government actors may not want to share power with citizens, who may have less knowledge and experience about policy processes. Finally, although citizens' costs for participation may be lowered, government costs may rise due to increased investments in technological infrastructure, data analysis, and specialized personnel (Marques, 2010, p. 3).

While there are more challenges with adopting e-participation ICTs, the institutional contexts of local governments may buffer the risks and costs. For example, governments that have adopted e-service and e-communication ICTs have likely created capacity, established best practices, and developed the specialized skills required to manage e-participation ICTs. Using models of e-democracy and e-government stage models, ICT adoption for civic engagement is viewed as being positioned along a continuum. Local governments that have adopted the less risky ICTs are more likely to adopt e-participation ICTs than those who have not adopted e-service and e-communication ICTs. Accordingly, the second research question is *To what extent does the adoption of e-service and e-communication ICTs influence the adoption of e-participation ICTs?*

The third question is *Whether and to what extent do municipal websites promote electronic engagement and participation?* This research examines website accessibility and usability, which are important characteristics that influence engagement. As U.S. municipalities and their departments begin to adopt ICTs, it is vital to understand what characteristics and under what conditions online activities promote engagement in our communities. I summarize the research questions in this study as follows:

1. What is the extent of e-participation adoption among U.S. municipalities?

2. To what extent do U.S. municipal websites promote electronic engagement and participation?

3. How do organizational, environmental, and institutional factors influence the adoption of e-participation ICTs among U.S. municipalities?

4. To what extent does the adoption of e-service and e-communication ICTs influence the adoption of e-participation ICTs?

5. To what extent does differentiation in the functional roles of government influence the adoption of e-participation ICTs?

To answer these research questions, I use a cross-sectional design and investigate the predictors of e-participation technology adoption based on the perceptions and survey responses of local government managers and the content of municipal websites and assessment of rates of e-participation tools on those sites. Using both survey data and municipal website data can greatly enhance our understanding of e-government technology adoption in local government. The analysis uses data from three sources: (1) Cross-sectional data from an e-government survey and website content analysis conducted in 2012 by researchers at the Center for Science, Technology, and Environmental Policy Studies at Arizona State University (ASU); (2)

demographic data from the American Community Survey published by the United States Census Bureau; and (3) form of government and website content data collected from individual municipal websites.

1.3 Organization of Dissertation

This dissertation is organized into seven chapters. Chapter 1 provides an overview of the dissertation. It introduces the motivation for the investigation of e-participation adoption and specifies the objectives and research questions. It also explains the research design employed to answer the key research questions. The organization of this dissertation is also presented at the conclusion of the chapter.

Chapter 2 provides a discussion of the development of e-government in the U.S. It traces the development of the legal framework required for e-government. The chapter concludes with a discussion of the democratic potential for e-government and role of municipal websites in facilitating participation and engagement online.

Chapter 3 presents the theoretical framework used to examine e-participation adoption and test the research hypotheses. Three theoretical perspectives are used to examine the predictors of e-participation adoption and include models of e-government development, technology enactment framework, and institutional theory.

Chapter 4 details the literature review, which provides a discussion and analysis of the literature relevant to the research questions. The chapter also presents approximately seventeen hypotheses that guide the empirical analysis. Hypotheses are developed to examine each variable and its relationship with e-participation adoption.

Chapter 5 describes the research design and methods. The research design consists of a cross-sectional approach, using multiple data sources to test the research hypotheses. This study

relies heavily on survey data from medium-sized municipalities in the U.S. Municipal website content is evaluated, coded, and included in the model. I use multiple procedures to analyze the data. However, the model for e-participation adoption is estimated using negative binomial regression.

Chapter 6 provides a discussion of the results of the various statistical procedures performed in this study. The predictors that emerge as significant are highlighted and discussed. The chapter concludes with a summary of the findings.

Chapter 7 begins with a summary of the findings of the statistical analysis. The confirmed and disconfirmed hypotheses are elaborated, and the implications for theory and practice are discussed. The chapter concludes with a discussion of the strengths and limitations of the study and directions for future research.

2. BACKGROUND: E-GOVERNMENT AND CIVIC ENGAGEMENT ONLINE

2.1 E-Government Development

Research on information technology (IT) in government is evident as early as the 1970s. However, the concept of e-government is relatively new, having emerged in the 1990s. Prior to the widespread diffusion of the Internet and personal computers, the study of technology use in government centered around improving productivity and managerial effectiveness through the automation of activities. Technology was not viewed as a core management function. Instead, technology and the environment were viewed as sources of environmental uncertainty (Thompson, 1967). In efforts to maintain stability and certainty, technology was isolated from the technical core (Thompson, 1967). Thus, prior to the widespread use of personal computers and the Internet, IT was not perceived as an important part of the organizational strategy and structure (Yildiz, 2007).

With the emergence of electronic technology in everyday work life, IT became a mechanism for improving work life and interactions between governments and the public. Public policies like the 1980 Paperwork Reduction Act (PRA) emphasized IT investment and information sharing across agencies and facilitated the shift towards greater integration of technology in government (Yildiz, 2007). Perhaps the most important impetus for the shift was Vice President Al Gore's 1993 National Performance Review (NPR) Report that initiated the "reinventing government" movement (Aldrich, Bertot, & McClure, 2002; Grönlund & Horan, 2004; Yildiz, 2007), and called for enhanced government efficiency and effectiveness through computerization and increased use of networks (Aldrich et al., 2002, p. 350). At the same time, the World Wide Web was quickly diffusing across the globe. In 1995, approximately 3 percent

of American adults used the Internet (Pew Research Center for the People and the Press, 1995), compared to 60 percent in 2000 (Rainie, Lenhart, Fox, Spooner, & Horrigan, 2000). The diffusion of the Internet and greater Internet use sparked significant reform, particularly at the federal level of government. In 1997, the NPR encouraged the federal government to employ Internet-based technologies to provide enhanced citizen access to information resources and agency services. From this effort, the federal government launched *FirstGov* as a one-stop portal providing citizen access to federal government information resources and services. President George W. Bush signed the E-Government Act of 2002 into law thereby laying the foundation for e-government. The Act also established requirements for the accessibility, usability, and preservation of e-government information, as well as explicitly defining the concept of e-government as:

> The use by the government of web-based Internet applications and other information technologies, combined with processes to implement these technologies to enhance the access to and delivery of government information and services to the public, other agencies and other government entities or bring about improvements in government operations that may include effectiveness, efficiency, service quality or transformation (*E-Government Act of 2002*, 2002, p.3).

E-government is an important topic for public administration scholars, as we seek to better understand how and why the interaction between technology and government matters. E-government involves organizational, managerial, and technological resources, making it a complex phenomenon involving various internal and external stakeholders and technologies. Its complexity is reflected in how it is defined across the spectrum of scholarly research. Research

on the use of e-government technologies tends to focus on variation in emphasis of e-government initiatives such as relationships between government and citizens, delivery of information and services, and enhanced access to government.

Practitioners and academics vary in their definitions of e-government. For example: "utilizing the Internet and the World-wide-web for delivering government information and services to citizens" (United Nations & American Society for Public Administration, 2002, p.1); "the relationships between governments, their customers (businesses, other governments, and citizens, and their suppliers by use of electronic means (Means & Schneider, 2000, p.121); delivery of government information and services online through the Internet or other digital means (West, 2004, p. 16); and the use of technology, or Web-based applications to enhance access to and efficiently deliver government information and services (Brown & Brudney, 2004, p. 97). Broader definitions of e-government extend beyond information and service delivery, broadly defining it as the use of information and communication technologies (ICTs) in a government setting. This broad perspective more precisely considers the potential for e-government to affect not only the external environment, but also the internal environment related to organizational behavior, roles, and responsibilities (Gil-Garcia, 2012). This research draws upon this broad perspective, defining e-government as:

> E-Government refers to the use by government agencies of information technologies (such as Wide Area Networks, the Internet, and mobile computing) that have the ability to transform relations with citizens, businesses, and other arms of government. These technologies can serve a variety of different ends: better delivery of government services to citizens, improved interactions with business and industry, citizen empowerment through access to information, or more efficient

government management. The resulting benefits can be less corruption, increased transparency, greater convenience, revenue growth, and/or cost reductions (The World Bank, 2014).

E-government involves implementing an intranet and central database to ensure internal interactions and efficiency, online service delivery and transactions, and digital democracy ("Government and the Internet Survey. Handle with Care," 2000; Moon, 2002, p. 425), and practitioners hope to realize these promises or benefits of e-government. Some of these benefits include engaging citizens while cultivating efficient and effective government services (Bertot, Jaeger, & McClure, 2008; West, 2004); improving access to and the transparency of government data (Noveck, 2009); and improving citizen satisfaction, public opinion, and trust in government (Tolbert & Mossberger, 2006; Welch, Hinnant, & Moon, 2005; West, 2004; Wong & Welch, 2004). At the same time, scholars recognize that not all that adopt e-government will realize these benefits. Government is vulnerable to a number of barriers to realizing the full benefits of e-government. E-government initiatives require investments in organizational resources and infrastructure and effective collaboration among managers and IT specialists. Therefore, the lack of technical and financial support, increased demands on staff, and difficulty integrating e-government with existing technological infrastructure may affect e-government implementation (Bertot et al., 2008; Ho, 2002). Based on a user-centered perspective, successful e-government implementation and development is dependent on factors such as user literacy, the relevance of information and services offered, usability and accessibility (Bertot et al., 2008), and ICT adoption requires capacity among city governments and departments to initiate, manage, and support ICTs. Finally, as the volume and ease of accessing government information online

increases, so do threats to privacy and data security. Governments may overcome these obstacles and fully realize the benefits of e-government, but not without investments in technology and personnel, and possibly a shift in organizational culture (Bertot et al., 2008).

2.2 Democracy Online and Municipal Website Content

Ho (2002) asserts that many governments have already adopted a shift in organizational culture, what he calls the e-government paradigm shift. According to Ho (2002), the e-government paradigm, embraces coordinated network building, external collaboration, and one-stop customer services, in contrast to the traditional bureaucratic paradigm, which is characterized by standardization, departmentalization, and the division of labor (p. 440). Municipal governments make this shift through the implementation of various ICTs in order to allow citizens to interact with government and obtain government information and services online (Ho, 2002). In Jun, a small town in southern Spain, the mayor uses Twitter, an SNS, to receive and respond to service requests from citizens. Once the resident submits their service request, the mayor acknowledges the request within minutes and includes the Twitter handle of the municipal employee responsible for servicing the request on the response. The responsible employee then tweets a confirmation of the completed service request. The mayor of Jun stated that using Twitter in this way is more efficient than returning phone calls, and requires fewer employees, thereby saving time and money (Powers & Roy, 2015).

As this example demonstrates, internet-based service provision, information sharing, and one-way communication may lead to a more responsive government but not necessarily a more democratic one because many e-government technologies, particularly SNS such as Facebook, Twitter, and YouTube can serve dual functions. On the one hand, they can be used to facilitate service provision and information sharing. On the other hand, they can be used to enable

participation in the policy process by enabling citizens to petition citizen input about local government issues and activities. This differentiation is important because the implementation of ICTs that promote engagement go beyond enhancing government responsiveness, but may lead to action from citizens through activities like engaging in political discourse and voting (West, 2005, p.16). A 2011 study reveals that although an average of 81 percent of local governments use Facebook and Twitter, only 65 percent state that they provide e-government in order to enable citizen participation or enhancing democracy (Norris & Reddick, 2012).

Both scholars and practitioners acknowledge the democracy-enhancing potential of ICTs as a key benefit and goal of e-government strategies. Contrary to traditional government structure, e-government strategies facilitate interaction between government and citizens that can enable democracy in three ways. First, they can promote greater access to information and services online. Governments use ICTs to post information online and allow citizens to submit requests and receive services online. Second, e-government strategies may promote and enhance communication between citizens and government. Governments use ICTs like e-mail, blogs, and Facebook pages to enable dialogue with and between, allowing citizen input and feedback on government services and policies. Government provision of audio and video broadcasts of speeches and meetings provide citizens with information about and access to policy processes. Third, e-government strategies can support collaborative governance, which emphasizes participation and collective decision-making, by linking citizens with neighborhood groups, advocacy groups, civic partners and initiatives (Mossberger & Jimenez, 2009). The potential for facilitating engagement is evident in cases across the U.S. In 2009 city officials in El Cerrito, California used e-government technology to engage citizens in the development of their five-year strategic plan in order to better understand the city's priorities and service community needs.

They developed an online tool, "Community Voice", that allowed citizens to submit ideas and vote on the importance of specific goals and initiatives online. As a result, the online tool enabled the city to engage with citizens who normally do not participate in government decision-making (Institute for Local Government, 2013).

These ICTs enable and may facilitate dialogue on service and policy issues between citizens and government and dialogue may also extend across the levels of government, to other engaged citizens, stakeholder groups and organizations, and the media. For example, the U.S. launched Data.gov in order to publish freely available data from the federal government. Data.gov also enables dialogue with experts across fields including local government issues. It enables users to provide feedback on the impacts of the data and provides links to external websites like SNS and local government for a further discussion on how users can leverage the data. Dialogue can ultimately lead to political knowledge and interest (Price & Cappella, 2002). The impacts of e-government strategies are not restricted to online participation since e-government can enable and facilitate information sharing, dialogue, and learning about government issues that lead to offline participation such as community voluntarism (Shah, Cho, Eveland, & Kwak, 2005).

3. THEORETICAL FRAMEWORK

This chapter discusses the conceptual foundations that frame the discussion of e-participation ICT adoption. First, this chapter introduces the evolutionary approach and the e-democracy models, viewing e-government adoption as being situated on a spectrum of civic engagement. The chapter then presents the theoretical framework, merging elements of socio-technical theory with institutional theory to explain the adoption of e-participation technologies among governmental organizations. The theoretical framework is used to determine the predictors of e-participation technology adoption in U.S. cities based on Jane Fountain's Technology Enactment Framework (TEF) (2001) and Institutional Theory.

3.1 The Evolutionary Approach

The evolutionary approach describes the development of e-government as an evolution that progresses through a series of stages (Gil-Garcia, 2012). This approach has inspired the development of various stage models that represent the level of sophistication or maturity and degree of interaction with citizens through e-government offerings. The stages range from an *initial presence*, whereby governments offer a simple web presence and in some cases, allow users to download documents, to the most sophisticated phase, *total integration* in which government offers all services in one online portal regardless of jurisdiction or service type (Hiller & Belanger, 2001; Layne & Lee, 2001). For example, a totally integrated website allows citizens to access local services such as public safety, parks and recreation, administration, and public works, as well as state and federal services from one main portal. This level represents true one-stop access to government and payment for services, fees, licenses.

Figure 1 illustrates the five stages of the evolutionary approach, or linear model of e-government development, although not all scholars integrate all levels in their models. For example, Layne and Lee (2001) develop a four-stage model of e-government evolution including *cataloging, transaction, vertical integration, and horizontal integration.* Meanwhile, the World Bank (World Bank, 2002) model includes three stages: *publish, transact, and interact*. E-government research uses the stage models to describe the evolution of e-government over time. Although various versions of the stage models have developed, they provide virtually consistent explanations of the evolution process.

The evolutionary approach depicts a linear perspective of e-government development, suggesting that e-government development moves along a linear path, achieving sophistication in a precise order until full maturity, or the highest stage in the model, is achieved. It does not consider governments that simultaneously initiate activities in all stages and thus is an oversimplification of e-government development (Yildiz, 2007). It also lacks predictive capacity (Coursey & Norris, 2008), with little regard to organizational dynamics, external pressures, or institutions since it focuses primarily on the web (Gil-Garcia, 2012). Coursey and Norris (2006) argue that stage models more accurately describe e-government in the earlier stages, from emerging to enhanced presence, but fail to be predictive, particularly in the latter stages (p.523), as the greater sophistication and maturity found in higher stages often requires greater administrative reform and collaboration across departments and levels of government (Gil-Garcia, 2012). Despite these criticisms, the evolutionary approach can be helpful in understanding e-government offerings because it is clear, concise, and flexible. Rather than describing e-government as a developing process of linear stages, the stage models can be used to help researchers sort and categorize e-government activities performed using ICTs. Stage

models suggest that either the types of ICTs used or the ways in which technologies are used will vary across stages. In addition, the stage models establish an argument for the significance of capacity building in e-government development. Since IT development requires financial, human, and infrastructural investments, inputs in earlier stages may help build capacity for greater inputs in later stages. Likewise, investments in less risky ICTs build capacity for more risky, complex ICTs.

Figure 1: Linear Model of E-Government Development

Step 1: Information   Step 2: Interaction   Step 3: Transaction   Step 4: Integration   Step 5: Participation
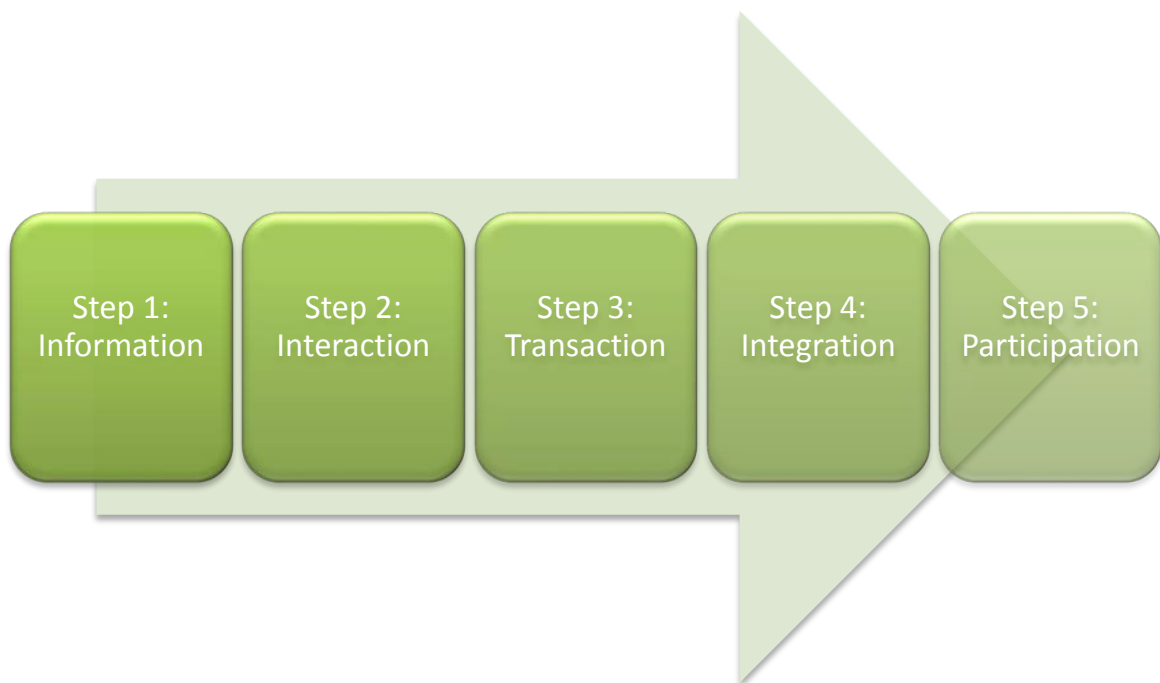
3.2 Models of Electronic Democracy (E-Democracy)

Kakabadse, Kakabadse, and Kouzman (2003) assert that ICTs can "enhance the degree and quality of public participation in government (p. 47)". They develop a typology of e-democracy models, suggesting that governments adopt and offer online services based on their purposes for e-government to enhance civic engagement. The typology proposes four models of civic engagement including information management, electronic bureaucracy, populist, and civil society.

The information management model emphasizes communication between citizen and government, or decision makers. Online activities reflecting this model include citizens contacting government officials, requesting information online, and government providing access to speeches, meetings, and agenda minutes online. Recent research describes this as a push strategy, whereby government websites use SNS and other ICTs such as email and newsletters to broadcast government messages and information without seeking feedback from constituents (Mergel, 2013). According to Mergel, in this model ICTs are used strategically as a supplement to existing communication mechanisms to share government information. The analyses of local (Mossberger, Wu, & Crawford, 2013) and federal (Mergel, 2013) websites finds that models that emphasize information dissemination predominate across agencies and departments. This is evident despite the proliferation of ICT adoption in society and among governments. Another recent survey of U.S. local officials finds that the primary reason for e-government ICT adoption is to provide citizens with access to government information (Norris & Reddick, 2012).

The electronic bureaucracy model emphasizes service delivery. A central value of this model is efficiency, as it emphasizes "easier, quicker, and cheaper transactions with government

on behalf of businesses and citizens and to reduce, over time, the size of the public sector (Kakabadse et al., 2003, p.47)". Generally, efficiency has long been a core value of government and service delivery is a primary objective. Service and transaction-based ICTs enable activities such as online payment of utility bills and taxes, online completion and submission of permit and license applications and renewals, and online requests for government records. However, as Norris and Reddick (2012) argue, service oriented ICTs require greater costs and complexity to implement. Consequently, they find that just over 31 percent of U.S. municipalities describe their e-government offerings as facilitating transactions (Norris & Reddick, 2012). However, municipalities may find it easier to justify investments in service and transaction based ICTs because "the revenues they generate can be calculated" (Kaylor, Deshazo, & Van Eck, 2001, p.297).

The populist model represents increased democratic activities and behavior online. In this model, citizens weigh-in on government issues. This kind of engagement can include voting online, participating in wikis, or attending town hall meetings virtually. Saebo et al. (2008) assert that while governments may seek citizen participation to ensure acceptance and legitimacy of political processes, external stakeholders may demand participation to promote their own interests (p. 401). This model closely reflects the adoption of e-participation ICTs, emphasizing citizens and enhancing their ability to participate in political processes and decision-making. Evidence of the populist model or pull strategies (Mergel, 2013) involves government's intentional pursuit of feedback and contribution from citizens. In 2013, the City of West Hollywood, California employed the populist model, using an online survey to solicit public input in order to inform and guide their social services funding priorities (International

Association for Public Participation, 2013, p.53; International City/Council Management

Association, 2011).

Finally, the civil society model emphasizes communication and political discourse among

citizens. Mergel (2013) refers to this model as a networking strategy in which government

implements ICTs in order to strengthen relationships between citizens and build content and

knowledge around developing and evolving issues. For example, governments can use SNS like

Twitter and Facebook to extensively engage with citizens and ignite communication and

dialogue with and among citizens retweets and comments (Mossberger et al., 2013, p. 355). The

U.S. General Services Administration (GSA) offers a strategic example of the civil society

model in practice. The federal agency used the SNS, GovLoop.com, to facilitate discussion in

order to generate innovative ideas that led to an improved acquisitions process (U.S. General

Services Administration, 2010). Evidence of this model in practice is less frequent, perhaps due

to the lack of control over who can participate in dialogue and the transaction costs associated

with managing comments, and sorting and vetting responses and feedback.

The information management, electronic bureaucracy, populist, and civil society models

focus on facilitating civic engagement, rather than facilitating inter-government or intra-

government communication, collaboration, and information exchange alone.

Kakabadse and colleagues' typology presents a citizen-centric model of e-democracy,

whereby governments adopt ICTs that reflect the model that best fits government and citizen

goals for engagement. According to Kakabadse and colleagues, e-democracy models do not

necessarily represent a linear process of adoption, but rather a progressive approach to e-

government adoption, whereby the models can be viewed as progressing from facilitating lower

levels of democracy online with the information management model to facilitating higher levels of democracy online with the populist and civil society models. In this way, the four models of e-democracy reflect the evolutionary approach to e-government and the adoption of e-participation ICTs.

The e-democracy and stage models underscore the importance of individual ICTs and suggest that governments may adopt ICTs to achieve different goals. In addition, e-democracy and stage models frame the discourse on the transformative potential of e-government for engagement and participation, and more broadly, the innovativeness of local government. These models describe the extent or sophistication of governmental implementation of ICTs and are flexible enough to be applied across levels of government.

Using the models of e-democracy and e-government stage models, this research views ICT adoption as being positioned along a continuum of civic engagement. One end of the spectrum represents the adoption of ICTs that offer fewer opportunities for engagement and democracy while the opposite end represents the adoption of ICTs that possess greater potential for engagement and participation. Along this spectrum, e-service represents the end of the spectrum associated with less participatory ICT adoption. On the opposite end, e-participation represents the adoption of ICTs that offer the greatest potential for participation, or engagement and ultimately democracy. These ICTs also enable social networking and collaboration and unlike e-communication ICTs, are adopted for the purpose of enabling participation and engagement (Macintosh, 2004; Mergel, 2013). E-participation is positioned on the opposite end of the spectrum, possessing the greatest potential for transforming participation and engagement. E-communication is positioned in the middle of the spectrum, offering greater potential for engagement and participation than e-service because e-communication ICTs provide information

about government and decision-making processes that may lead to greater levels of participation and engagement. This Continuum of Civic Engagement Online is shown in Figure 2.

Figure 2 Continuum of Civic Engagement
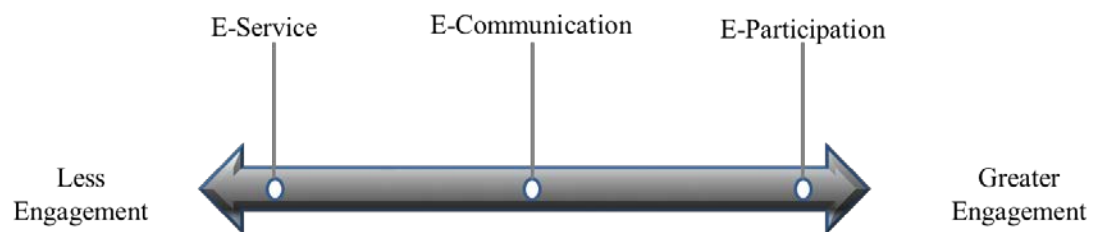
Distinguishing ICTs based on their characteristics and goals enables comparison of adoption or implementation across organizations. The models discussed in this chapter also reflect elements of the model for building the virtual state as envisioned by Fountain (2001), which is the theoretical framework used in this research. Fountain's *Technology Enactment Framework* is discussed further in the following section.

3.3 Technology Enactment Framework

The organizational innovation literature states that technology characteristics matter for innovation adoption and implementation. For example, some technologies require greater human, financial, and technological resources to implement, while organizations might perceive other technologies to be more compatible with existing values and practices (Rogers, 1995). Therefore, from a socio-technical perspective, the selection of ICTs depends on the match or fit between the technology and the implementing organization and its employees. The socio-technical perspective, however, omits some important elements that are particularly germane to government organizations. Paul Appleby (1992) notes that unlike other organizations, a key characteristic of government is its relationship with and accountability to the public. In the same vein, the political, economic, and social conditions in the environment matter to governmental organizations and determine the work they perform. Thus, while the socio-technical perspective appropriately considers the fit between technology and organization, it ignores key features that matter for government specifically. Integrating institutional theory with the socio-technical perspective may offer a more comprehensive approach to e-government research by addressing how organizational norms, rules and behaviors, and the external environment influence technology adoption.

Accordingly, this research uses a modified version of Jane Fountain's Technology Enactment Framework (TEF) to explore technology use in municipal governments in the United States. Fountain develops and employs the framework to understand the effects of information technology on institutional change in U.S. federal agencies. However, she also notes that the framework can be used to understand how public organizations, particularly governmental organizations, use technology. Fountain's framework examines the process of institutional

change that is driven by organizational structure or forms, institutional arrangements, and what she calls *enacted technology*. According to Fountain, the process of enactment is mediated by organizational and institutional arrangements (p.11). The enacted technology produces organizational outcomes, which are varied and unpredictable because they are dependent upon the nuanced organizational and institutional arrangements that are embedded in individual organizations. Over time, the outcomes may result in changes to organizational forms and institutional arrangements (Fountain, 2001; Gil-Garcia, 2012).

Fountain asserts that as objective information technologies become available to use, they are transformed into enacted technologies through perceptions, design, implementation, and use. According to Fountain, organizational forms and institutional arrangements mediate the technology enactment process. Fountain identifies two organizational forms, the *bureaucracy* and *networks*. The elements and characteristics of each organizational form shape behavior in distinct ways, and ultimately result in varying impacts to information technology use in those organizations. The bureaucratic form reflects Max Weber's rational-legal ideal organizational form, and is characterized by hierarchy, jurisdiction, standardization, rules and files, and stability. In contrast, the networked organizational form is characterized by trust, social capital, interoperability, pooled resources, and access to knowledge.

Fountain argues that the institutional arrangements or the embeddedness of government actors in cognitive, cultural, social, and legal and formal structures influences the design, perceptions, and uses of technologies (Fountain, 2001, p. 88). In other words, technologies are enacted through and by institutions. Therefore, because local governments and departments are nested within larger social and political environments, the organizational and individual structures, practices, and behaviors reflect the rules, beliefs, values, and norms within their

environments. In the same way, the implementation or enactment of particular e-government technology, then, is a reflection of the local government's rules, values, norms, and perceptions of technologies or individual ICTs. According to the Fountain's framework, enactment is directly influenced by organizational forms and indirectly influenced by institutional arrangements (Fountain, 2001). The use of institutional theory makes Fountain's work an important contribution to the literature (Bretschneider, 2003; Dawes, 2002).

A critical limitation of Fountain's framework is that it fails to acknowledge the role of the environment in the enactment process. The environment must be considered because it may be a source of opportunities and constraints for the organization, "which are filtered by the actions of management through its policies, which affect enactment and, ultimately, outcomes" (Gil-Garcia, 2012; Kraemer, King, Dunkle, & Lane, 1989). In order to compensate for the lack of attention given to the environment, Gil-Garcia (2012) provides a modified version of TEF, Enacting E-Government Success. This framework models success as a function of individual organizational, institutional, and environmental factors and their interactions that can influence technology adoption in local governments. The key components of the model include organizational e-government success, which serves as the outcome variable, institutional arrangements, and environmental conditions, organizational structures and processes.

Gil-Garcia's framework contends that organizational structures, such as centralization, formalization, and functional roles, and processes directly influence technology enactment. For Gil-Garcia, organizational structures also include management action, which matters because managers filter opportunities and constraints in the environment (Kraemer et al., 1989) and have certain expectations about the ICTs, like increased productivity and cost reduction (Fountain, 2001). Gil-Garcia's model represents an interaction between organizational structures, processes,

and success because outputs can inform and influence future organizational processes and management strategies. For example, an ICT that successfully improves productivity may alter the structure of the organization. Similarly, an ICT that improves citizen participation may result in the need for increased or specialized personnel to filter citizen responses, which may also alter the structure of the organization.

Environmental conditions encompass the context in which local governments are situated that can affect technology enactment or adoption. These contexts include political, economic, and demographic conditions, which shape ICT design and implementation. Gil-Garcia finds different kinds of environmental conditions have varying effects on e-government outcomes. For example, he finds that the relationship between e-government success and political orientation is mediated by institutional arrangements (Gil-Garcia, 2012, p. 97). Similarly, the relationship between e-government success, based on a measure of website functionality, with demand for e-government is mediated by management strategies. However, a direct effect exists between e-government success and the size of the state economy, or the overall size of the state budget, number of jobs, and private earnings within a particular state (Gil-Garcia, 2012). At the local level, the environment may influence e-government adoption directly because local government, compared to state governments, are in a better position to determine and meet the demands of their constituents (Oates, 1972).

Finally, there are various ways to measure e-government success. Fountain (2001) differentiates between e-government success and technology enactment. She asserts that enacted technology includes the perception, design, and use of objective technologies and represents e-government success as a measure of the benefits and features of the enacted technology. Based on this logic, it is possible to measure e-government success in terms of direct outputs such as

website functionality and technological sophistication, which may lead to outcomes such as increased efficiency, service quality, transparency, or enhanced citizen participation. From this perspective, the enactment or adoption of e-services and e-communication technologies may yield outputs such increased human, infrastructural, and financial capacity that lead to the adoption of e-participation technologies. This research will combine elements of the TEF and Gil-Garcia's frameworks, to investigate the predictors of e-participation adoption.

3.4 Institutional Theory

This research extends the work of Fountain and Gil-Garcia by incorporating institutional theory and applying the model at the municipal level of government in the US. The premise of institutional theory is that organizations are subject to pressure from the environment (DiMaggio & Powell, 1983). Forces such as laws, regulations, customs, social and professional norms, culture, and ethics constrain organizations, compelling them to mirror other organizations that share similar pressures or environmental conditions. Among government organizations, the political, policy, and socio-economic environments constrain decision-making behavior, rules, and norms (DiMaggio & Powell, 1983). Institutional arrangements are the key component to Fountain's framework. Fountain applies institutional theory to explain technology use in government, linking technology, organizations, and institutions. Although Scott (2005) distinguishes between three variants of institutional theory including rational choice, normative, and cultural-cognitive, for Fountain, these institutions are cognitive, cultural, sociocultural, and legal government systems that indirectly influence enactment because they are reinforced through monitoring and enforcement or through social mechanisms such as acceptance or disproval (Fountain, 2001). An alternative approach to studying institutions in the context of e-government is to examine the influence of internal and external pressures on adoption behavior.

DiMaggio and Powell (1983) assert that institutional pressures increase homogeneity among organizations within an institutional environment. These pressures are *coercive* pressures from legal mandates, superior organizations, or social expectations; *mimetic* pressures arising from mimicking successful examples or neighboring cities, especially when outcomes are uncertain; and *normative* pressures or influences to increase homogenous behavior from professionalization. These pressures can work independently or in various combinations to affect organizational behavior. In order to survive organizations will seek legitimacy from their institutional environments. For local governments, perceived pressures from various stakeholders may influence whether and the extent of ICT adoption

Fountain's institutional analysis focuses on three case studies of U.S. federal government agencies largely ignores the external environment. However, government at the local level likely experiences greater influence from the external environment because cities are the level of government closest to citizens (Oates, 1972). In addition, cities are not sovereign as are states and federal governments, making local governments potentially more vulnerable to pressures from a variety of sources including higher levels of government, citizens, interest and advocacy groups, and other local governments. Therefore, the relationship between institutions and e-government adoption is likely to be mixed, direct or indirect, depending on the type of institution, rather than indirect as evident at the federal and state levels. For example, coercive institutions can be rules, laws, and pressures from higher levels of government to which municipalities are required to comply. In this case, we can expect that coercive institutions have a direct relationship with adoption. However, mimetic and normative pressures require filtering by management because they rely on knowledge of adoption behaviors of other similar municipal governments. Mimetic and normative pressures also rely on knowledge of

professional standards across governments (Walker, 1969). Typically, this knowledge is diffused through professional networks and associations in order to influence behavior. In this way, the effect of organizational and environmental factors on ICT adoption depends on the level of mimetic and normative pressures.

This research examines the institutions of significance for U.S. municipalities, assuming a direct relationship between coercive pressures and e-government technology adoption as shown in

Figure 3. In comparison to Gil-Garcia's framework, e-services and e-communications serve as predictors of the more advanced e-participation technology adoption rather than outcomes. The logic here is that successful e-participation adoption requires capacity, infrastructure, and experience that can be gained through the implementation of e-services and e-communication technologies. For example, government personnel may likely be skilled in the use and application of Twitter for disseminating information. Governments may then leverage that knowledge and experience in using Twitter to process service requests, and eventually to solicit policy input from citizens. This example represents an incremental approach to e-participation adoption where the skills and experience of e-communication and e-service adoption are leveraged for e-participation adoption.

Figure 3: Proposed Model of E-Participation Adoption
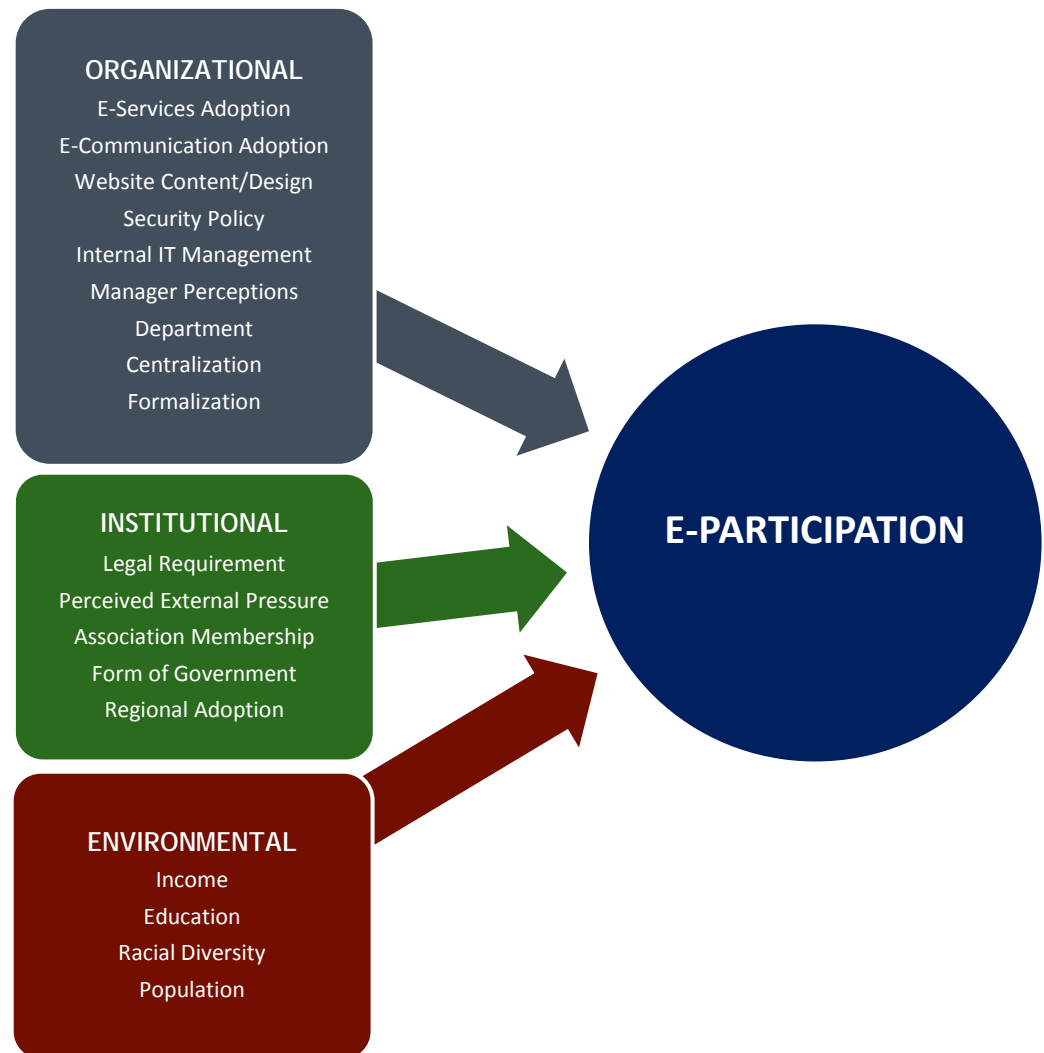
4. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

This review of the empirical e-government literature analyzes how scholars have contributed to our understanding of the factors that influence the adoption of e-government technologies. This chapter presents approximately three categories of hypotheses, which are organized by elements of the theoretical framework: organizational, institutional, and environmental factors. The chapter concludes with a literature review on evaluating the content of municipal websites and the use of those evaluations in understanding e-government adoption behavior.

4.1 Organizational Conditions

The innovation and e-government literature suggests that several organizational conditions may influence technology adoption. Based on the theoretical framework, the organizational conditions construct is comprised of two sub-constructs that include general organizational characteristics and management strategies. General characteristics are more enduring than management strategies, which are more flexible (Gil-Garcia, 2012). Based on the literature, this research examines the influence of management strategies and three organizational general characteristics on technology adoption. The management strategies include the extent of adoption of e-services ICTs, the extent of adoption of e-communication ICTs, whether an outside department or individual is responsible for maintaining the website, and the presence of a clear security policy. The three organizational general characteristics are organizational functional roles or department, centralization, and formalization.

<u>4.1.1 Management Strategies</u>

Local governments may build their capacity for e-participation adoption by implementing

e-services and e-communication ICTs. Having adopted e-communication ICTs provides local

governments with knowledge, experience, and established the infrastructure to reduce the

transaction costs associated with e-participation adoption. As a result, local managers in

municipalities that have already adopted e-services and e-communication ICTs may view

adopting e-participation ICTs more favorably, with less risk and uncertainty, than those local

managers in municipalities who have not adopted e-service and e-communication ICTs.

E-communication ICTs are implemented in order to enable and improve communication

government and its stakeholders. The effects of these improvements may not necessarily lead to

efficiency and improved performance. However, the lessons learned during implementation, the

financial and human resources and infrastructure invested help governments prepare and build

capacity to implement more complex and risky ICTs like e-participation.

Layne and Lee (2001) assert that e-communication involves the dissemination of

government information online. It assumes that citizens possess the digital literacy skills needed

to access and use the shared information. E-communication ICTs include posting of council

agenda and minutes, the provision of downloadable forms for manual completion, and e-

newsletters. However, governments also use newer technologies such as Facebook, Twitter, and

YouTube to disseminate information. These ICTs are used to supplement or in addition to

traditional and existing communication mechanisms, not a replacement. Mergel (2013), Jimenez,

Mossberger, and Wu (2012), and Norris and Reddick (2012) find that federal and local

governments overwhelmingly adopt e-communication ICTs more readily and extensively

compared to e-service and e-participation ICTs. This is likely due to the relative ease and fewer transaction costs associated with adoption.

Layne and Lee (2001) elucidate some important characteristics of e-communication that allow scholars to draw conclusions about its importance e-participation adoption. E-communication requires the regularly updating websites to ensure transparency and accuracy of shared information. In addition, in an effort to achieve greater efficiency, governments may post greater information online to devote less time to fielding and responding to citizen questions. These processes are also required for e-participation. In this way, implementing e-communication builds administrative processes and preparedness necessary for e-participation implementation.

Furthermore, the input and participation enabled by e-participation ICTs may complicate the decision-making processes and require extensive resources to implement. For example, e-participation may require human resources in order to sort through feedback and responses to assess their content and determine their importance.

Therefore, I expect:

H_1: Greater adoption of e-communication technologies will be positively associated with the adoption of e-participation technologies.

In attempts to achieve efficiency, governments consider the relative cost of technology use. Technologies that improve performance and increase efficiency are more likely to be adopted than those whose financial benefits are less certain. E-services include online payments of fines and fees, online completion and submission of license applications, online property registration, and online requests for services such as pothole repairs. Norris and Reddick (2012) find that in 2011 nearly 60 percent of U.S. local governments offered at least one service online

compared to less than 35 percent in 2004. Although e-services are less frequently adopted as e-communication, their frequency outnumbers e-participation adoption.

E-services can improve performance by making government more efficient and responsive, and they can improve the ease of conducting government business. Initially, these ICTs may be complex and more costly to implement than e-communication, or those ICTs that facilitate one-way or simple two-way communication (Norris & Reddick, 2012). However, e-service implementation addresses many of the challenges that are associated with e-participation adoption. Layne and Lee (2001) assert implementing service and transaction-based ICTs require governments to install mechanisms to ensure security and confidentiality and manage authentication because of the personal and politically sensitive nature of the information citizens provide.

E-service progression and success requires active engagement and use by citizens and external stakeholders (Layne & Lee, 2001), thereby legitimizing e-participation because government has already established a level of engagement and trust with citizens. Simultaneously, those citizens that conduct transactions online with government are assumed to have the digital skills and access necessary to participate online. Zheng, Schachter, and Holzer (2014) find that municipalities with e-services initiatives are more likely to adopt e-participation likely because e-service implementation emphasizes value in citizen experiences and priorities (p.656). Therefore, I expect:

H$_2$: Greater adoption of e-service technologies will be positively associated with the adoption of e-participation technologies.

Trust and data security are re-occurring themes in the e-government literature. Perceptions of trustworthiness and security may influence citizen use of e-government (Carter & Bélanger, 2005). These perceptions may be influenced by having privacy and security statements and policies for handling sensitive information and government data that are submitted or posted online (Tolbert & Mossberger, 2006). There is little empirical work on the relationship between data security and e-government development. However, Moon (2002) finds that approximately 35 percent of U.S. municipalities cited security issues and nearly 22 percent cited privacy issues as barriers to e-government. Similarly, Ho and Ni (2004) find that issues with security and privacy are consistent barriers to implementing e-government initiatives over time. Norris and Moon (2005) state that based on a 2002 survey of U.S. local governments, approximately 37 percent site issues regarding security as an important barrier to e-government initiatives. Over time, this issue persists. Norris and Reddick (2012) report that approximately 30 percent of U.S. local governments site issues regarding security as a barrier to e-government adoption, based on the findings from a 2011 survey.

Scholars assert that security and confidentiality are important elements at higher stages of e-government models where high levels of participation and engagement can occur. At the highest stages of the stage models, citizens complete online activities that require citizens to provide sensitive information such as credit card numbers. They may also perform activities that reflect higher levels of participation and engagement (Hiller & Belanger, 2001). While a higher level of participation occurs at these stages of e-government, they also pose the highest levels of privacy concerns because they involve the submission of sensitive and confidential information online and security breaches may compromise confidentiality and privacy, ultimately reducing confidence, legitimacy, and credibility in the technology and government (Garson, 2006). Issues

with confidentiality and security are a direct challenge to e-government development particularly because the installation and maintenance of security mechanisms will likely require substantial technical, human, and financial resources in order to protect the privacy and rights of individuals at these stages. In addition, cities may be reluctant to adopt e-participation ICTs like those that facilitate voting online, due to fears of sabotage and the lack of a paper trail (Garson, 2006). Because of this additional burden to effectively obtain, maintain, and secure data, cities must develop clear policies to ensure data privacy and security when adopting e-service and e-participation technologies. Data policies may represent another form of burdensome bureaucratic rules, thereby hindering adoption of the related ICTs, but they also symbolize a clear understanding of the threat of online privacy and security and the capacity to address those threats. Having clear security policies may signal capacity to effectively manage security and privacy issues, leading to greater adoption of ICTs that promote higher levels of engagement and participation. Therefore:

> **H3: A clear security policy to ensure citizen privacy will be positively associated with the adoption of e-participation technologies.**

The scholarly research on the importance of an internal, separate IT department is mixed. Li and Feeney (2012) examine ICT adoption among U.S. municipalities while Tolbert, Mossberger, and McNeal (2008) study e-government adoption among U.S. states. Both studies find no statistically significant relationship between having a separate information technology department and e-government technology adoption or continued innovation in e-government over time. However, Tolbert, Mossberger, and McNeal (2008) note that having an internal IT department provides infrastructure and leadership capacity to develop and sustain e-government. Moon (2002) supports this claim, suggesting that an internal IT department has implications for

the importance of infrastructure and leadership capacity to manage adoption, particularly for more sophisticated e-government technologies. Jun and Weare (2010) posit that, "as managers of the IT department become prominent players in the work of other departments" (p. 501), IT departments benefit from and support the advancement of e-government because it creates dependencies from other departments (Jun & Weare, 2010). Therefore, having the internal management of IT, through an IT department or having a designated person in a government department, rather than outsourcing IT management is expected to be an important driver of more sophisticated levels of e-government technology adoption.

H4: Internal IT management within operating departments will be positively associated with the adoption of e-participation technologies.

Managers' perceptions of technology may be important predictors of organizational innovation. Moon and Norris (2005) assert that some local governments may be more receptive to innovation and new practices than others and that innovations differ in their ease of adoption because of varying perceptions of innovations stemming from experiences or risk tolerance (p. 47). From their perspective, innovation may depend on the extent to which it receives the support from management. In local e-government, whether or not management supports adoption may depend on their perception of the usefulness of the technology and its applications.

Feeney and Welch (2012) posit that the intensity of adoption is influenced by managers' perceptions of the outcomes associated with the application of the technology. The authors investigate the intensity of e-participation adoption in U.S. municipalities and distinguish three categories of outcomes for citizen participation based on the results of a factor analysis: input process, organizational decision outcomes, and reduced democratic governance process. Municipalities with greater mechanisms for government-citizen interaction, *input processes,* are

more open to their environment and have a greater potential to exchange information (Feeney & Welch, 2012, p. 817). *Organizational decision outcomes* refer to the extent to which engagement processes affect agency policy and decision outcomes. For example, potential positive outcomes of citizen participation in the decision-making process are stakeholder support and trust. However, negative potential outcomes may be inefficiencies in the decision-making process that emerge from integrating diverse stakeholders with varying perspectives and demands (Ahn & Bretschneider, 2011). Finally, citizen participation may affect the *reduced democratic governance process*. Greater citizen participation may require municipalities to share or relinquish control, whereas less participation may result in less support for and trust in government (Macintosh, 2004). Feeney and Welch (2012) use the three categories to capture managers' perceptions about the extent to which e-government ICTs lead to positive and negative outcomes. They find a statistically significant relationship between the number of e-participation ICTs adopted and *reduced democratic governance processes* and *input processes*. That is, increased use of e-participation ICTs is related to perceptions that the implementation of those technologies leads to positive of the outcomes. Perceptions are the outcome variable while ICT use is the predictor variable. However, the literature on organizational culture suggests that manager beliefs and perceptions lead to or result in organizational outcomes.

Wang and Feeney (2014) investigate variance in the determinants of technology adoption based on the type of technology used. They examine two ICTs, e-service and the intranet, that are intended to increase efficiencies in local government. E-service is expected to improve efficiencies by increasing government responsiveness with external stakeholders while the intranet enhances organizational internal communication, information sharing, and administrative processes. The authors find that a risk-taking culture has no statistically

significant relationship with e-service adoption, but it has a direct, positive, and statistically significant effect on intranet adoption.

Moon and Norris (2005) measure managerial innovation orientation using the "institutional intention" to innovate through budgetary recommendations for reinvention programs (Moon & Norris, 2005, p. 51). They find that managerial innovation orientation is a strong predictor of the various aspects of e-government adoption. The findings here suggest that managers' beliefs, orientations, or behavior influence adoption behavior in public organizations. Therefore:

> **H5: Positive perceptions of technology outcomes will be positively associated with e-participation adoption.**

4.1.2 General Characteristics

Municipalities are divided into departments based on their functional roles. These roles may vary in their degree of interaction with the public. For example, the Mayor's office may be highly political, and in efforts to maintain a favorable a perception among its constituency, may adopt ICTs that enable citizen input and clarification of citizens' preferences. Conversely, the municipal finance departments are generally responsible for compiling and maintaining the financial records and ensuring municipal compliance with federal, state and local laws and regulations. Interactions between the public and finance departments may be service-related like the issuance of payments, or communication-related like posting annual budgeting documents, rather than engagement and participation related. In this way, finance departments are more internally centered, performing activities that emphasize maximizing internal processes and efficiencies. Similarly, departments with internally centered activities, or those with less interaction with the public, may be less likely to adopt e-participation technologies because e-

participations fail to offer a solution to an existing problem or efficiency gains to internal processes and achieving overall department missions.

Bugler and Bretschneider (1993) conduct an analysis to determine the factors that encouraged managers to pursue new innovations. The authors survey state management information systems (MIS) managers and program managers in the U.S., rating their perceptions of the importance of new technologies. They argue that agency function or central task affects the extent of its reliance on technology to perform its mission (Bugler & Bretschneider, 1993, p.284). Functions included in their analysis include commerce, education, employment, environment, health, human/social, safety/crime, and transportation. Using analysis of covariance to estimate their model, they find a statistically significant relationship between function and perceptions of the importance of technologies. Their findings suggest functional roles matters for predicting adoption based on the importance of the technology for achieving departmental missions. Similarly, West (2004) finds differences in e-government performance based on whether the U.S. state agency was more or less internally centered. For example, he finds that state agencies geared more toward external interests, like economic development agencies, are more likely to provide services online rather than budget departments, which have processes that are more internally driven.

Similarly, municipal departments may have varying political incentives to adopt e-participation technologies. For example, the mayor or administrator's office and police department may seek improved perception of government and trust from citizens (Grimmelikhuijsen & Meijer, 2015) while finance departments may adopt fewer participation ICTs in favor of information ICTs that enhance transparency rather. Therefore, I expect:

H$_{6a}$: Finance departments will report lower rates of e-participation technology adoption.

Organizational centralization and formalization represent characteristics of a bureaucratic organizational structure. Centralization refers to the degree of centralization of decision-making at one level or unit within an organization, as opposed to decentralized organizations, whereby decision-making is spread across organizational units and levels (Rogers, 1995). High centralization discourages innovation by restricting participation in decision-making among organization members or stakeholders. As a result, the information used in decision-making activities is homogenous and less knowledge sharing occurs, which impedes innovation (Damanpour, 1991; Hage & Aiken, 1969).

The e-government paradigm and reinventing government initiative has shifted the focus from away from the traditional bureaucratic structure towards one that it is citizen-centered yields greater efficiency (Feeney & DeHart-Davis, 2009; Ho, 2002). Damanpour (1991) conducts a meta-analysis of the empirical studies on various organizational innovations from 1960-1988. The results indicate a negative relationship between innovation and centralization. Likewise, Li and Feeney specifically examine e-government and conclude that the adoption of e-services technologies was higher where there was less centralization. However, they find no statistically significant relationship between the adoption of e-communication technologies and centralization. More recent research also finds no statistically significant relationship between centralization and the adoption of e-services among U.S. cities (Wang & Feeney, 2014). However, Feeney and Welch (2012) find that centralization has a negative, statistically significant relationship with negative perceptions of e-government outcomes, suggesting that centralized decision-making related to technology adoption does not include managers (p. 12). Meanwhile, Feeney and DeHart-Davis (2009) find that centralization is associated with lower

creativity and productivity and higher risk. These findings suggest that centralization may

negatively affect the adoption of technology, particularly higher level ICTs that are characterized

by greater uncertainty or costs.

H7: Greater centralization will be negatively associated with the adoption of e-participation technologies.

Formalization refers to the extent of written rules, regulations, and procedures (Pugh,

Hickson, Hinings, & Turner, 1968). This organizational characteristic may reduce innovation by

preventing or slowing the organizations' response to changes in the environment such as citizen

demands and new technologies. At the same time, formalization allows for greater clarity in

roles, which reduces uncertainty. Reduced uncertainty may facilitate innovation. Feeney and

DeHart-Davis (2009) examine the relationship between centralization and formalization and

creativity, productivity, and risk, among public employees. Their findings suggest no statistical

relationship between formalization and the creativity and productivity variables but and a

negative association with risk. However, because formalization may reduce costs associated with

errors and uncertainty:

H8: Greater formalization will be positively associated with the adoption of e-participation technologies.

4.2 Institutional Pressures

Institutional arrangements are laws, regulations, policies, and rules that shape

organizational forms and affect enacted technology, organizational outputs, and outcomes

(Fountain, 2001). According to Fountain's theoretical framework, institutional arrangements are

not expected to directly affect enactment or outputs or outcomes, rather they mediate the

relationship between environmental and organizational conditions and the outcome variable,

technology adoption. Gil-Garcia (2012) analyzes the 50 state government-wide websites in the US to determine the sophistication and extent of e-government adoption. He finds that four institutional arrangements, including IT-related laws and regulations, and formal and informal rules, are indirectly related to e-government sophistication and adoption while they are directly related to organizational structures and processes. In addition, Gil-Garcia (2012) finds that institutional arrangements account for approximately 54 percent of the variance when combined with environmental factors. This supports the theoretical claim of the importance of institutional arrangements in e-government adoption. However, neither Gil-Garcìa nor Fountain account for the influence of different types of institutions on the adoption of different types of ICTs. In addition, the influence of institutions may vary across levels of government. This study examines the influences of coercive, normative, and mimetic institutional pressures (DiMaggio & Powell, 1983) on the adoption of e-government ICTs among local governments.

4.2.1 Coercive Isomorphism

Laws, rules, pressures from external stakeholders represent coercive pressures that affect local government behavior. Involving citizens in policy-making activities may represent innovative behavior because it challenges the traditional model of bureaucracy characterized by Weber. In this model, government is viewed as a closed system, with policy-making occurring among top management. Citizen participation transforms this philosophy and organization of government, by making government open to its environment and having citizens take a role in the key functions of government (Ho, 2002). Tolbert and Zucker (1983) examine the adoption of civil service procedures among U.S. cities from 1880 to 1935. They find that cities located in states mandating adoption adopted civil service procedures more rapidly than cities in states that did not mandate adoption. However, mandates and laws do not always precipitate compliance,

especially if there are strong coalitions that oppose the innovation or if there is disagreement on the overall utility of the innovation (Tolbert & Zucker, 1983).Therefore, based on the theoretical and empirical literature, I expect that:

> **H9: A legal requirement for citizen input in policy-making activities will be positively associated with the adoption of e-participation technologies.**

Within the coercive institutional mechanism, the source of the pressure may also influence technology adoption. For local governments, coercive pressures from the state and federal levels of government, as well as other local government departments may stem from resource dependence and legal mandates. Pressures from these sources may influence adoption because they can potentially threaten punishment or strong arm municipal governments into complying with and adopting policies and practices that are perceived as important (Nicolaou, 1999).

Ho and Ni (2004) find no support for the influence of coercive pressures on technology adoption. In 2001, they surveyed county treasurers in the state of Iowa to examine e-government technology adoption. The results of the logistic regression analysis suggest that neither coercive pressures, conceptualized as constituency pressure and peer pressure, significantly influence e-government technology adoption among Iowa county treasurer offices. Ho and Ni's study is limited because it focuses only on state treasurer's offices in a single state. Expanding their study to treasurer's offices across the U.S. or various departments within the state of Iowa may demonstrate variance in the influence of constituencies and peers.

However, Oliveira and Welch (2013) investigate social media adoption among approximately 500 U.S. cities. They find negative, statistically significant relationships between

pressures from higher levels of government and the adoption of social media to communicate or share information, and to facilitate participation. Therefore, I expect the following:

H₁₀: Greater influence from government stakeholders will be negatively associated with the adoption of e-participation technologies.

4.2.2 Normative Isomorphism

Governments may also be subject to external pressure from businesses, advocacy groups, and citizens. Unlike pressure from higher levels of government, these normative sources of external pressure use on cultural rules, norms, or expectations to induce adoption rather than regulatory rules or authority (Scott, 2005). As Internet adoption spreads in the private sector, businesses and citizens may expect and demand similar web-enabled capabilities from government. In response, municipal governments may adopt behaviors in order to keep up with social expectations and maintain legitimacy (Nicolaou, 1999). Advocacy groups inherently support ideas and causes that influence organizational decisions and policies. They may work with the media to pressure municipal governments to adopt policies and ICTs that enable greater access to government information, broader participation in government, and give political voice to citizens. These efforts may influence adoption because municipal governments seek legitimacy through satisfaction and favorable perceptions by the public.

Ho and Ni (2004) argue that e-government innovations may develop in response to external pressures from stakeholder groups. They contend that businesses and citizens may observe technological successes in the business sector and pressure government to adopt those successes. Oliveira and Welch (2013) find positive, statistically significant relationships between influence from civil society and the adoption of social media for communication and facilitating

participation. Civil society, referred to in this research as non-governmental stakeholders, includes public opinion, businesses, advocacy groups, and the media. Therefore:

> **H11: Greater influence from non-governmental stakeholders will be positively associated with the adoption of e-participation technologies.**

Normative pressures stem from professionalization, which can come from education, through professional networks and associations, and the norms of a profession, sector, or industry. Walker (1969) examines why some states adopt new programs more quickly than others and what determines the spread of these innovations among the states. He finds that specialized communication through professional associations is a key determinant of policy innovation (Walker, 1969). Professional associations facilitate communication among governments, serving as both information hubs and networks. Specialized communication quickly spreads information and creates an awareness of new developments in 'laggard' governments, or those who are less responsive to new ideas (Walker, 1969). Therefore, membership in professional associations is crucial to obtaining information about new technologies, as well as best practices and strategies on how to implement and develop them. Governments with managers as members of professional associations will have better access to e-government related information than those without access and those managers will work to promote national standards in their local communities. Association membership may be particularly important for learning about ICTs that promote efficiency and democracy, which often involve greater risk and uncertainty and require greater resources to implement. Therefore,

> **H12: Professional association membership among managers will be positively associated with the adoption of e-participation technologies.**

Normative pressures also stem from professional training, the adoption of workplace values, and shared missions and goals about public service and public delivery of goods and services. Through public policy and public administration programs, universities provide formal training in order to develop organizational norms and professional behavior among city managers, thereby creating homogenous professionals that occupy the same occupation across organizations (DiMaggio & Powell, 1983, p. 152). Normative isomorphism, or homogeneity among public managers, is promoted through filtering of personnel whereby it is expected that managers will possess certain skills as a precondition for holding the position. Ultimately, because of their training and participation in professional networks, these professionals possess similar skills, behavior, and perspectives on important issues, which may significantly shape organizational behavior. In this way, council-manager forms of government are considered professional in comparison to other forms of local government. City managers and department managers participate in conferences, workshops, programs, and publications that enable the exchange of information about the availability and appropriateness of organizational policies and practices, including technologies. This network of shared education, training, and information results in shared beliefs about what kinds of ICTs are acceptable (DiMaggio & Powell, 1983; Nicolaou, 1999).

While there is some evidence of shared norms and values among public sector workers we expect variation to occur based on the form of city government. The empirical literature on the influence of the form of government on e-government adoption is mixed. Moon (2002) finds that council-manager forms of government are more likely to adopt e-government initiatives like websites and e-government strategic plans, and are more likely to be early adopters of web technologies. Similarly, Li and Feeney (2012) find that council-manager forms of government

are more likely to adopt e-government ICTs, citing the professionalization of managers in council-manager governments who seek efficiency. However, Moon and Norris (2005) and Ahn (2011) find no statistically significant relationship between the form of government and adoption. Differences in findings may result from diminished effects due to the inclusion of institutional or environmental variables or that the researchers are investigating much smaller cities, in the case of Li and Feeney (2012). For example, a more professional government may not be significant without professional association membership or high political competition in the environment. However, because council- manager forms of government are oriented toward a management form of administration and tend to be more receptive to the innovative adoption of technology and tend to exhibit higher levels of e-government adoption (Moon, 2002).

Although city managers are described as professional administrators that value innovation and efficiency, the professionalization of council-manager forms of government and the bureaucratic structure found in public organizations also embrace efficiency, effectiveness, and technical expertise, values that may not square with the democracy (Dahl, 1989; Gawthrop, 1997). Democracy relies on participation, regardless of citizens' expertise in a particular policy area, which can result in losses in time and control of the decision-making process. Because citizens often lack technical expertise and background information to make informed decisions, participation requires the sharing of information and educating the public. This can take longer than it would if the expert, experienced managers had made the decision without citizen participation. Participation also implies sharing or loss of control of decision-making to citizens. When there is greater citizen participation, managers acting as self-interested participants may perceive a loss of power, autonomy, prestige, and influence in the decision-making process (Moynihan, 2003). Managers may believe that the time and lack of expertise that are

characteristic of citizen participation may lead to inefficient, poor decisions. Moreover, mayors

are elected while managers are appointed. Therefore, mayors, seeking favorable perceptions

from voters, have a political incentive to adopt ICTs that give citizens a voice in decision-

making. On the contrary, managers are appointed, thereby providing less of a political incentive

to encourage participation and greater incentive to emphasize efficiency. Therefore, I expect that:

> **H13: A council-manager form of government will be negatively associated with the adoption of e-participation technologies.**

4.2.3 Mimetic Isomorphism

DiMaggio and Powell (1983) state that uncertainty encourages imitation whereby

organizations imitate other organizations they perceive as legitimate or successful. The degree of

influence of the mimetic pressure is "based upon a shared interpretation of important values in

the organizational and social context (Nicolaou, 1999, p. 136)." Mimetic pressures may be

regional. That is, jurisdictions may mimic adoption behavior or other jurisdictions within the

same region. Mimicking and imitation lowers the risk and uncertainty associated with adopting

technologies in which the efficiency is not certain (DiMaggio & Powell, 1983; Nicolaou, 1999).

Municipalities observe the adoption behaviors of nearby, similar, and successful adopters, then

adopt those behaviors, policies, processes, and technologies that are perceived as beneficial and

having little political opposition (Mooney, 2001).

Walker (1969) studied regional influences, suggesting that adoption behavior is clustered

by geographic region within the U.S., because political culture, or what people believe about

government and what constitutes appropriate government action, varies by geographic region

(Elazar, 1972). Political culture is evident in the literature across disciplines, which suggests that

southern states exhibit more homogeneity in terms of policy behaviors (Alt, Lassen, & Skilling, 2002; Alt & Lowry, 1994; Walker, 1969). Therefore, cities within the same region may appear more homogenous in terms of the types and sophistication of e-government ICTs they adopt. Reddick and Norris (2013) suggest that cities within the same region are homogeneous in terms of professional management and found that location matters for the adoption of e-services and e-information. Similarly, Jun and Weare (2010) examine the institutional motivations for technology adoption among cities and measures mimetic pressures as the average number of services implemented by other municipalities in the same state and find a positive and statistically significant relationship with adoption.

At the state level, Berry and Berry (1990) examine state lottery adoption in the United States, hypothesizing a positive relationship between adoption numbers of bordering states that have already established lotteries. The authors find a positive, significant association, suggesting that a state will adopt the lottery as adoption increases among neighboring states (Berry & Berry, 1990). In another study, Berry and Berry (1992) examine the regional influence on the adoption of tax innovations among U.S. states. They hypothesize that regional adoption of a tax innovation reduces the negative public perception and risk associated with adoption. They find that the probability of adoption increases as the number of neighboring state adopters increases.

As with normative pressures, mimetic pressures may be more influential when there is greater uncertainty, risk, and cost associated with a particular technology. Because e-participation ICTs require greater technical resources and may involve greater uncertainty in terms of benefits than e-communication ICTs, I expect that:

> **H14: Higher levels of e-participation adoption among other cities in the same region will be positively associated with the adoption of e-participation technologies.**

4.3 Environmental Conditions

The digital divide, defined as inequalities in access to the Internet, has important implications for e-government because the lack of access to technology may result in less use of e-government technologies. At the city level, the digital divide concept is difficult to capture for two reasons. First, there is no generally accepted definition of Internet adoption because of varied definitions of adoption ranging to home subscribership, Internet use anywhere, or Internet use on mobile phones. Secondly, the digital divide is a concept that is measured using indicators that may include race, education, income, and computer ownership and Internet access. Based on research, populations with lower percentages of whites, education, income, computer ownership, and Internet access are more likely to possess a digital divide (Organization for Economic Cooperation and Development, 2001). The availability of citywide data on computer ownership and home Internet access is inconsistent across cities. Therefore, scholars have conceptualized the digital divide using socio-economic demographic data, finding that cities with higher percentages of white citizens in the population, income, and education tend to have greater adoption of the Internet, thereby reducing the digital divide.

For example, Ho (2002) analyzes 55 of the largest U.S. city government websites in order to understand e-government development across the nation. He defines the digital divide in two ways: the percent of minority population and per capita income, understanding that a larger minority population and lower per capita income constitute a larger digital divide, as guided by the literature. Ho (2002) finds that less sophisticated websites offering fewer opportunities for citizen feedback and collaboration online are found in communities with larger minority populations and lower per capita income. Similarly, Gil-Garcìa (2012) examine website

functionality of state governments in the U.S and find that indicators of the digital divide

including internet access, income, education, and computer ownership are significantly

associated with website functionality. Moreover, Ahn (2011) finds that high levels of diversity

are consistently negatively related to the adoption of e-communication technologies. Because the

digital divide can be viewed as a proxy for citizen's demand for e-government (Helbig, Gil-

García, & Ferro, 2009), it can be an important indicator of e-government development in cities.

> **H15A: Higher percentages of white population in a city will be positively associated with the adoption of e-participation technologies.**
>
> **H15B: Higher percentages of individuals with a bachelor's degree in a city will be positively associated with the adoption of e-participation technologies.**
>
> **H15C: Higher per capita income in a city will be positively associated with the adoption of e-participation technologies.**

Organizational size has also been found to be an important predictor of technology

adoption. Brudney and Seldon (1995) assert that larger organizations have more diverse and

complex environments with greater demands, which require greater resources to manage them.

Therefore, larger organizations will be more likely to adopt technologies to manage these

complexities. Moon and Norris (2005) argue that larger cities have larger budgets, more highly

skilled staff, and IT departments which provide greater resources, making them more likely to

adopt alternative mechanisms for service delivery. Larger cities are more likely to adopt more

costly ICTs because they have greater resources and can achieve economies of scale, or spread

the costs of adoption and implementation across a larger population (Brudney & Selden, 1995;

West, 2001).

Moon (2002), Ahn (2011), and Li and Feeney (2012) examine the relationship between

population and e-government adoption. Moon (2002) finds a positive association between

municipal size and the adoption of intranet and longevity of city websites. Similarly, Ahn (2011) examines e-communication adoption and find that population, measured as the log of the city population, is a consistent positive predictor of adoption. Li and Feeney find that organizational size, measured as the log of the number of full-time equivalent employees in the organization, is positively and significantly related to the adoption of e-services but is not an important predictor of e-communication adoption. However, Medaglia (2007) studied e-participation in Italian municipalities, comparing participatory ICT adoption to one-way and two-way communication ICT adoption. He found that smaller municipalities are more likely to adopt one-way and two-way communication ICTs. Further, Medaglia (2007) claims that larger municipalities have a greater incentive to adopt participatory ICTs because face-to-face meetings with citizens are less frequent and more costly than in smaller municipalities (p. 275). Given previous findings, I expect that:

> **H$_{16}$: City population will be positively associated with the adoption of e-participation technologies.**

4.4 Evaluating E-Government Websites

Municipalities can promote the transformation of citizen participation and engagement by adopting website design that enables engagement and participation by providing accessible and usable content (Mossberger & Jimenez, 2009; West, 2005). Access to certain ICTs and clear, easy-to-use websites may ease citizens access to and interaction with governments both online and offline. Therefore, an evaluation of municipal websites is necessary to determine how website design and ICT implementation enable engagement and participation online.

The literature on government websites describes the progress of e-government development and establishes standards or benchmarks for evaluation that enable us to compare e-government adoption across municipalities. While the adoption of ICTs may reflect varying degrees of e-democracy, municipal website design may inhibit or enhance democracy online. Particularly, the literature suggests that website design can enhance democracy by providing relevant and accessible content (Mossberger & Jimenez, 2009; West, 2005). The consensus from the literature examined here is that municipalities are adopting a greater number of information and communication technologies on their websites. They are moving towards providing more and richer content online. However, as e-government has become more widespread and more governments have a web presence with greater web content, municipalities are slow to adopt transformative or democracy-enhancing ICTs. Website rankings find that there are few top performers, whose content and design enable participation and engagement. Fewer municipalities adopt particular ICTs that facilitate participation and ultimately, facilitate democracy while even fewer enable opportunities for political dialogue and networking or website designs that facilitate participation by all users.

Musso, Weare, and Hale (2000) conducted a content analysis of 270 municipal websites in California in 1996 and 1997 in order to determine the extent to which web applications advanced models of local governance reform. The authors specifically examined the extent to which California websites reflected participatory approaches to governance or "good democracy" scoring websites based on 125 variables regarding the types of information provided, the level of interactivity, and the general design and emphasis of each site (Musso et al., 2000, p. 6). Their evaluation finds that most municipal websites fail to realize the potential of ICTs, failing to promote democracy and facilitate democratic processes online. Instead,

California municipal websites promote tourism and municipal services by providing or posting information about these opportunities online.

Scott (2006) extends the work of Musso, et al. (2000). He examines the websites of the 100 largest U.S. metropolitan statistical areas in 2004 in an effort to determine the extent to which government websites enable public involvement, using the evaluation criteria developed by Musso et. al (2000). Scott finds that compared to earlier studies municipal websites offered richer, more diverse content, like crime statistics and local demographics. In addition, Scott finds that municipalities enabled direct interaction between citizens and city officials and participation through volunteer opportunities. However, few municipalities facilitate opportunities to engage in policy discussions or forums or networking opportunities. Scott (2006) implies that these findings reflect governments' inability to monitor such interactions and their aversion to legal and political risks.

Ho (2002) examines websites of the 55 largest cities in the U.S. in 2002. He finds evidence that cities had moved from the traditional paradigm, towards information and user-oriented designs. According to Ho, the information-oriented design provides rich and extensive content, while the user-oriented design represents the most significant move from the traditional paradigm. The user-oriented design categorized web content based on user needs. The findings of the content analysis were analyzed with survey responses from city webmasters. Ho finds that cities that embraced the user-oriented design also appear to embrace democratic values such as being open to external input and collaboration.

Mossberger, Wu, and Crawford (2013) examine social media use as well as other interactive tools among the 75 largest U.S. cities between 2009 and 2011. Using evaluation

criteria similar to Musso et. al (2000), the authors seek to understand the adoption of social

media for facilitating citizen knowledge and engagement. Their findings point to significant

spikes in the adoption of social media like Facebook, YouTube, and Twitter, with increases

ranging from 250 percent to over 600 percent between 2009 and 2011 (Mossberger et al., 2013).

They find that in the largest 75 cities, there were more opportunities for participation in 2011,

compared to 2009. The authors also used case studies to determine how cities use social media.

They examined three U.S. cities including Seattle, Louisville, and Chicago using in-depth

content analysis of technologies and interviews with city information technology officials. Their

results concluded that although cities adopt ICTs that offer the potential for participation, the use

of social media resembles one-way communication, rather than two-way or networking

communication.

Mossberger and Jimenez (2009) analyze websites for the 20 largest cities in Illinois and

the 75 largest U.S. cities to examine "the potential for local e-government to facilitate civic

engagement" (p. 14). Cities are ranked based on the evaluation criteria established by Musso et

al. (2000). They find that the top scorers consistently rank high in content and design-related

criteria. That is, the top performers across the U.S. facilitate access to a range of important

information, promote both online and offline engagement, and have website designs that are

user-friendly, accessible and secure (Mossberger & Jimenez, 2009). The top performer among

Illinois cities, Naperville, allows customization through the creation of user accounts and allows

residents to find detailed information about their community. However, overall, the cities in their

analysis offer few opportunities for "e-democracy as collective problem-solving or deliberation

through technology (Mossberger and Jimenez, 2009, p. 27)." In addition, across the cities,

accessibility for disabled and non-English speaking users is limited. Moreover, for smaller cities, the lack of privacy and security statements continue to challenge democracy online.

Accessibility signals the progression of government (West, 2005) and ease of access and understanding of the information governments provide. According to the World Wide Web Consortium (W3C), website accessibility refers to the extent to which people with disabilities can use understand and interact with the Web. This also includes designing websites that cater to the varied needs and preferences of its users. Thus, a website is considered accessible if it can be understood by all users, irrespective of the software, hardware, and physical or cognitive differences among users. Usability refers to the effectiveness, efficiency, and satisfaction of goals achieved online (World Wide Web Consortium, 2016). Scholars evaluate accessibility and usability in a variety of ways including the availability of online information; services provided; privacy and security; readability; and disability and foreign language access (Mossberger & Jimenez, 2009; West, 2005). The availability of online information refers to the extent to which a municipal website provides basic information such as address and contact information, links to other sites, and publications. This element represents a basic level of e-government, achieved by most governments with an online presence. Online service delivery allows stakeholders to conveniently perform government transactions online. West (2005) asserts that online service delivery can improve citizen access to government. Variation in the number and types of online services across governments may be due to barriers to the adoption of more sophisticated technologies including the capacity to manage websites or financial resources to maintain and update websites.

There are a number of factors that determine the usefulness, accessibility, and appropriateness of a government website. For example, posting privacy and security statements

that cover e-government actions, information, and data help reassure stakeholders (West, 2005), quelling citizens' fears about interacting with government online. Readability refers to the extent to which website information and content are written at a level that can be understood by citizens, and thus us an important factor in assessing the potential usefulness of a government website. Similarly, municipal websites can be evaluated based on whether they can serve those with disabilities and foreign language needs. Disabilities may include visual, hearing, and other physical impairments. Complex and highly technical language or the inability to see or hear the website content can hinder accessibility.

Democracy online may be influenced by the extent to which municipal websites possess a variety of features. For example, low readability and the lack of accessibility for blind citizens may exclude those citizens from the information they need to participate.

Therefore, I expect that:

H17: Cities with more user-centered website content and design will be positively associated with the adoption of e-participation technologies.

5. RESEARCH DESIGN AND METHODS

This research employs a cross-sectional design with a concurrent mixed method approach. The study relies heavily on survey data to examine the predictors of the adoption of participation enabling ICTs among U.S. municipalities. This study also assesses the extent of participation enabling design and content of U.S. municipal websites. Based on the theoretical framework detailed in Chapter 3, this research uses data to develop statistical models predicting the use of ICTs for the purpose of facilitating engagement. This study examines 500 U.S. municipalities to investigate the perceptions of municipal managers related to technology use and municipal website data to investigate the behaviors of municipalities online. This section describes the data and measures used for this study.

5.1 Research Questions

This study uses socio-technical theory, institutional theory, and the technology enactment framework in order to explain technology adoption behavior in U.S. municipalities, first examining the *extent of e-participation adoption*. It extends the work of previous scholars, exploring the influence of various organizational, environmental, and institutional factors on technology adoption at the municipal level of government. It also distinguishes between types of technologies in order to better understand the extent to which different factors matter for the adoption of different technologies. Thus, the questions for this research are developed to address the gap in the literature and to increase knowledge about the factors that influence technology adoption in U.S. municipalities.

This research takes a socio-technical perspective, recognizing the importance of human agency and the social embeddedness of technologies. Accordingly, the primary research question

is: *How do organizational, environmental, and institutional factors influence the adoption e-participation ICTs, among U.S. municipalities?*

In this research, I make the key distinction between types of ICTs. Based on the linear models of e-government adoption, this study posits that the adoption of ICTs builds an organization's technological capacity, leading to the greater adoption of ICTs. For municipalities, the risk, complexity, and ease of implementation associated with e-services and e-communications may be more favorable than e-participation ICTs. Therefore, the adoption of e-services and e-communication ICTs may build the organization's capacity to adopt e-participation ICTs. Accordingly, this study investigates the *extent to which the adoption of e-service and e-communication ICTs influence the adoption of e-participation ICTs.*

Based on the socio-technical perspective, the design and content of municipal websites represent the user experience and interaction with government online and may be important facilitators or hinderers of participation online. Therefore, I am concerned with understanding *whether and the extent to which municipal websites promote engagement and participation online.*

Finally, I am particularly interested in whether and the extent to which adoption behavior may vary across municipal departments. Departments vary in their functions and degree of interaction with the public, thus, adoption is expected to reflect these differences. Therefore, I examine the *extent to which differentiation in the functional roles of government influences the adoption of participation enabling technologies.*

5.2 Research Design

       The research design is implemented using a mixed method, cross-sectional design. Mixed methods research combines quantitative and qualitative forms of inquiry, resulting in a more robust study than either strategy alone could accomplish (Creswell, 2009). This study combines survey research (quantitative), administrative data, and content analysis (qualitative) in order to understand technology adoption behavior in U.S. municipalities.

       The central premise of this study is that organizational, environmental, and institutional factors influence the adoption of e-participation technologies among U.S. municipalities. Therefore, survey research is used to examine statistical relationships between the three groups of factors and technology adoption. Survey research enables researchers to generalize from a sample to a population in order to make inferences about the population, and for this study, enables the researcher to simultaneously examine and analyze several constructs across the population sample (Babbie, 2010).

       Although survey research is widely used in the literature, the influence of municipal website content and design on e-participation adoption is less studied. The examination and evaluation of website content and design must be achieved using qualitative methods. Therefore, this study uses content analysis to evaluate U.S. municipal website design and content, a predictor of the adoption of e-participation ICTs. Babbie (2010) defines content analysis as a form of qualitative research that studies recorded human communications, including websites. The goal of content analysis in this study is to provide knowledge and understanding about the extent to which municipal website design and content promotes participation online and the factors that contribute to the adoption of such websites.

This study employs a concurrent transformative design, merging survey data and coded municipal website content and design data and analyzing them simultaneously. Using this approach allows the researcher to gain broader perspectives from different types of data (Creswell, 2009).

5.3 Data

There are three sources of data for this study including individual U.S. city websites; the American Community Survey published by the U.S. Bureau of the Census; and survey data collected from municipal managers in the National Study on Technology and Civic Engagement in Local Governments. This study draws extensively from a 2012 national on-line survey and website content analysis on e-government technology and civic engagement conducted by the Center for Science, Technology and Environmental Policy Studies at Arizona State University. The survey was designed to provide information about technology-facilitated civic engagement in U.S. local governments. It provides descriptive information about the extent of technology use in selected U.S. cities and provides organizational data that can help explain why civic engagement may be more prevalent in some governments and not in others. In addition to administering the survey, the research team also collected information from city websites to gauge whether municipalities enable participation and civic engagement through their websites. The coded website data provides descriptive information about the extent of access to government, citizen participation, services and transactions, and transparency on municipal websites.

Additional data were collected to capture organization, environment, and institutional measures. Accordingly, this research uses four additional sources. In February 2014, the research team collected the form of government data for each city. Demographic data for 2011-2012 for

each city was collected from the American Community Survey published by the U.S. Bureau of

the Census. Finally, cities U.S. geographical divisions were determined based on data from the

U.S. Bureau of the Census. Table 1 provides a summary of the data and sources used for this

research.

Table 1: Data Sources

Data	Source	Year
Website Content and Design	Data collected from municipal websites - National Study on Technology and Civic Engagement in Local Governments	2011-2012
Form of Government	Municipal websites	2014
Demographics	American Community Survey, U.S. Census Bureau	2011-2012
U.S. Regions/Divisions	U.S. Census Bureau	2014
Technology use and managerial perceptions	National Survey on Technology and Civic Engagement in Local Governments	2012

5.4 Survey Sample and Data Collection

5.4.1 Survey Research Sample and Data Collection

Based on the 2005 U.S. Census, there are 1,186 U.S. cities with a population of 25,000 to

250,000. City population is highly skewed to smaller cities (approximately 37 percent), with only

14 percent of cities having a population of 150,000 to 250,000. The researchers conducting the

National Study on Technology and Civic Engagement in Local Governments elected to conduct

a census of cities with populations of 100,000 to 250,000 because larger cities are more likely to

possess the capacity to purchase and use technology for civic engagement (Feeney, Welch, &

Haller, 2012), resulting in 184 cities. For the remaining 316 cities, a proportional random sample

was drawn from the cities with populations of 25,000 to 100,000, with 59 percent of the sample

drawn from cities with populations of 25,000 to 50,000, 28 percent from cities with populations

of 50,000 to 75,000, and 13 percent from cities with populations of 75,000 to 100,000, yielding a sample of 500 cities.

The researchers selected five positions to be surveyed in each of the 500 cities: City Manager or City Administrator, Director of Community or Economic Development, Finance Director, Director of Parks and Recreation, and Deputy Police Chief. These positions represent the five most common positions across all local government in the US. The total local government sample is 2,500 individuals; therefore, the initial sample consisted of 2,500 individuals across 500 cities. The online survey was administered in 2012 to an adjusted sample of 2,428 individuals after removing a total of 72 individuals for which there was no email address or the individual was no longer in the position. A total of 2,428 managers were invited to participate in the online survey in February 2012. The survey was administered online using Sawtooth Software®. Managers were sent an initial alert letter on February 13, which was followed up by an email invitation to complete the online survey questionnaire on February 27. Postcard or email reminders were sent approximately every two weeks until the close of the survey on May 5. The survey yielded a total of 845 responses from 429 U.S. municipalities, with an overall response rate of 33.8 percent, based on the RR2 response rate formula set by the American Association for Public Opinion Research (AAPOR) (The American Association for Public Opinion Research, 2011). The total number of respondents by department is shown in Table 2.

Table 2: Survey Response by Department Type

Department Type	Frequency	Percentage
Mayor's Office	144	17.0
Community Development	187	22.1
Finance	132	15.6
Parks and Recreation	180	21.3
Police	202	23.9
TOTAL	**845**	**100**

5.4.2 Website Content Analysis Sample and Data Collection

This study examines municipal website design and content to understand how municipalities use ICTs to promote participation online. The researchers used the same sample of 500 cities but focused on the municipal main web page rather than the department web pages. Researchers conducted website content analyses for 500 U.S. municipalities using evaluation criteria focused on civic engagement and participation. Drawing from Mossberger and Wu (2012) the researchers evaluated each city website using the 29 criteria concerning citizen engagement in the areas of access to government, citizen participation, services or transactions, and transparency. Coders were instructed to search city websites for the 29 criteria and locate each item within no more than three clicks from the homepage. However, criteria such as social media links and foreign language translations should be listed directly on the city's homepage. In

these cases, coders were given specific instructions for each criterion, applying binary codes where 0 means the criterion was not located within three clicks of the homepage and 1 indicates that the city provides the item on the website, within three clicks of the homepage. Descriptive statistics for the website features included in the analysis are shown in Table 6.

In order to assess the accessibility and usability of municipal website content and design, four coders analyzed the 500 municipal websites in two stages. In each stage two coders worked independently to code 250 websites each, resulting in each website being coded twice. At the conclusion of the coding, a fifth researcher conducted an inter-coder reliability analysis with the percent of agreement ranged between 62% and 91% (Lombard, Snyder-Duch, & Bracken, 2002). A sixth coder reassessed all inconsistent codes.

5.5 Survey Research Measures

This study relies heavily on survey research to capture the adoption behavior as well as the organizational, environmental, and institutional contexts in which U.S. municipalities are embedded. This section details the measurement of the dependent variable and independent variables in the model.

5.5.1 Outcome Variable

The outcome variable *E-Participation* is the sum of responses to a survey questionnaire item that asked respondents to indicate whether or not their department used approximately twenty-six ICTs *for the purpose of facilitating participation by citizens or external stakeholders.* These ICTs enable two-way communication from government to citizens and external stakeholders as well as social networking. The full list of the ICT options are noted in Table 3: Descriptive Statistics for E-Participation ICTs. *E-Participation* technologies offer the potential

for greater participation and engagement (Macintosh, 2004; Medaglia, 2007; Saebo et al., 2008).

Responses to individual items were coded 1 if departments used the technology and 0 if they did

not. The dependent variable, *E-Participation*, is the sum of the responses for each ICT, with

values ranging from 0 to 21 and a mean value of 4.12, as shown in Table 3.

Table 3: Descriptive Statistics for E-Participation ICTs

ICTs to enable or facilitate participation by citizens or external stakeholders	N	Min.	Max.	Mean	SD
Facebook	604	0	1	0.689	0.463
Twitter	476	0	1	0.609	0.488
YouTube	317	0	1	0.423	0.495
LinkedIn	258	0	1	0.302	0.460
Gov Loop	35	0	1	0.200	0.406
Skype	129	0	1	0.318	0.467
Flickr	70	0	1	0.357	0.483
Google Talk, Blackberry Messenger, MSN, or other instant messaging tools	276	0	1	0.268	0.444
MySpace	46	0	1	0.370	0.488
Google Docs	103	0	1	0.214	0.412
Blogs	231	0	1	0.437	0.497
Online chats	105	0	1	0.467	0.501
Discussion forums	200	0	1	0.455	0.499
Video sharing tools (e.g. YouTube)	337	0	1	0.359	0.480
Web surveys or polls	521	0	1	0.601	0.490
Wikis	58	0	1	0.224	0.421
Electronic polling during face-to-face meetings	86	0	1	0.535	0.502
Document collaboration tools (e.g. Google Docs)	146	0	1	0.199	0.400
Work coordination tools (e.g. Google Calendar, MS Project)	342	0	1	0.211	0.408
File sharing tools (e.g. DropBox)	262	0	1	0.160	0.368
Voice over IP (e.g. Skype)	222	0	1	0.329	0.471

Based on the theoretical framework a general empirical specification for technology adoption is expressed as:

Adoption = f (Organizational attributes, institutional pressures, and environmental conditions).

5.5.2 Predictor Variables

Based on the theoretical framework, the predictors for adoption were organized into three categories: organizational, institutional, and environmental. Descriptive statistics for all predictor variables are shown in Table 10.

Based on the theoretical model outlined in

Figure 3**Error! Reference source not found.**, general organizational measures represent more the enduring characteristics of an organization. This research examines the effects of three general organizational characteristics on technology adoption: functional role or municipal department; centralization; and formalization.

5.5.2.1 Organizational Factors

Management strategies represent the flexible characteristics of the organization. This research uses nine variables to capture management strategies. The first three management strategies, *E_Services*, *E_Communication*, *and Web_Access* are three proxies for technological capacity. *E_Services* is an additive scale from four questionnaire items that asked respondents to indicate whether or not their department offered the following services online: (1) online payment for services including fees and fines; (2) online delivery of local government records or department information to citizens who request information; (3) online requests for services that your department is responsible for delivering; and (4) online completion and submission of job

applications (Feeney et al., 2012). *E_Services* ranges from 0 to 4 with a mean value of 2.49.

Descriptive statistics for the four survey questionnaire items that compose *E-Services* are shown

in Table 4

Table 4: Descriptive Statistics for E-Services ICTs

	N	Min.	Max.	Mean	SD
Online payment	677	0.00	1.00	.6130	.48742
Online requests	686	0.00	1.00	.7230	.44783
Online delivery	644	0.00	1.00	.5854	.49304
Online submission	652	0.00	1.00	.7239	.44740

E_Communication is the sum of responses to a questionnaire item that asked respondents

to indicate whether or not their department used approximately twenty-six ICTs *for the purpose*

of disseminating information externally. These ICTs enable both one-way and two-way

communication, from government to citizens and external stakeholders, as well as social

networking, but are used only for communication rather than engaging citizens, based on survey

responses about the purpose of the ICTs. *E_Communication* ranges from 0 to 24 and a mean

value of 6.59. Descriptive statistics for E-Communication ICTs are shown in Table 5.

Table 5: Descriptive Statistics for E-Communication ICTs

	N	Minimum	Maximum	Mean	Std. Deviation
Facebook	619	0	1	0.937	0.243
Twitter	487	0	1	0.924	0.265
YouTube	327	0	1	0.823	0.383
LinkedIn	265	0	1	0.634	0.483
Gov Loop	35	0	1	0.457	0.505
Skype	134	0	1	0.507	0.502
Flickr	73	0	1	0.740	0.442
Google Talk, Blackberry Messenger, MSN, or other instant messaging tools	285	0	1	0.646	0.479
MySpace	47	0	1	0.617	0.491
Google Docs	107	0	1	0.449	0.500
Blogs	239	0	1	0.690	0.463
Online chats	108	0	1	0.528	0.502
Discussion forums	204	0	1	0.480	0.501
E-mail	783	0	1	0.908	0.289
Online newsletters	637	0	1	0.879	0.326
Audio webcasts	333	0	1	0.664	0.473
Text messaging	511	0	1	0.748	0.435
RSS	195	0	1	0.749	0.435
Video sharing tools (e.g. YouTube)	349	0	1	0.728	0.446
Web surveys or polls	534	0	1	0.418	0.494
Wikis	58	0	1	0.483	0.504
Electronic polling during face-to-face meetings	90	0	1	0.289	0.456
Document collaboration tools (e.g. Google Docs)	152	0	1	0.428	0.496
Work coordination tools (e.g. Google Calendar, MS Project)	353	0	1	0.442	0.497
File sharing tools (e.g. DropBox)	268	0	1	0.489	0.501
Voice over IP (e.g. Skype)	228	0	1	0.535	0.500

This study also examines the influence of municipal website content and design on the adoption of participation and engagement enabling ICTs. Drawing from Mossberger and Wu (2012), this research measured each municipality website based on the presence of website features that represent accessibility and usability, as an indicator of civic engagement potential (Mossberger & Jimenez, 2009;Mossberger & Wu, 2012; West, 2005). Researchers applied a code of 1 if the feature was found on the website within three clicks from the homepage and 0 if the feature was not found within three clicks. Six website features characterize accessibility and usability and include 1) Displays privacy statement/ policy or disclaimer with a privacy section, 2) Is there a searchable database/search bar, 3) Provides a searchable index or list for archived laws, regulations, and requirements, 4) Provides published date on main page, 5) Statement or advertisement declaring that the site is developed or maintained by an outside contractor, and 6) Provides access to non-English speakers. Descriptive statistics for each criterion are shown in Table 6. The six measures of website content and design are combined with the survey data in the statistical analysis that models the predictors of e-participation adoption among U.S. municipalities.

Table 6: Descriptive Statistics for Six Website Accessibility and Usability Characteristics

	N	Minimum	Maximum	Mean	Std. Deviation
Privacy Statement	845	0.00	1.00	.6473	.47808
Search Bar	843	0.00	1.00	.9193	.27248
Law Index	839	0.00	1.00	.9654	.18278
Page Date	835	0.00	1.00	.0551	.22829
Site Index	843	0.00	1.00	.3025	.45961
Non English	843	0.00	1.00	.2183	.41332

IT Management indicates whether there is internal IT management or a separate IT department or a designated person (=1) rather than outsourcing to an external provider (=0) (Li & Feeney, 2012; C. J. Tolbert et al., 2008). The survey item asked respondents to indicate: *Who is responsible for maintaining and improving your department website and e-government services? IT Management* is coded 1 if there is internal IT management through either a designated person in the department or a separate information technology department, 0 if an external contractor.

The fifth management strategy is *Data Security* is measured as the average of two survey items that asked respondents to indicate their level of agreement with the following statements: (1) Our organization has clear policies about public provision of documents and data that all employees must follow and (2) Our organization has adopted clear data security policies to

ensure citizen privacy (Macintosh, 2004; Saebo et al., 2008). Response options included

1=strongly disagree, 2=disagree, 3=neither agree nor disagree, 4=agree, and 5=strongly agree.

Drawing from Feeney and Welch (2012), this study uses four variables to capture

manager beliefs of the extent to which e-government ICTs lead to positive and negative

outcomes for citizens, the city, and local government. Survey respondents were asked 'In your

opinion, to what extent do electronic information and communication technologies lead to the

following outcomes?'

1 Improve governmental decision-making
2 Lead to better policies
3 Increased uncertainty for my organization
4 Revitalize public debate
5 Distort political information and facts
6 Undermine democratic practices
7 Improve information dissemination to external stakeholders and citizens
8 Reduced clarity about what citizens want
9 Increase opportunity to interact and collaborate with other government officials
10 Increase access to government services
11 Enable feedback on service quality
12 Increase certainty about the importance of the work I do
13 Enhance citizen trust of government
14 Increase conflict with citizens
15 Improve efficiency and lower costs of the department

Response options were on a 5-point Likert scale: 1=to a very small extent, 2=to a small extent,

3=somewhat, 4=to a great extent, and 5=to a very great extent. In order to reduce the data, factor

analysis was conducted, which determines the number of latent variables within a set of items.

Descriptive statistics for the 15 items as shown in **Table 7**.

Table 7: Descriptive Statistics: Variables in Technology Outcomes

	N	Minimum	Maximum	Mean	Std. Deviation
Improve governmental decision-making	732	1	5	3.35	.945
Lead to better policies	731	1	5	3.27	.936
Increase uncertainty for my organization	724	1	5	2.06	.929
Revitalize public debate	728	1	5	2.95	.998
Distort political information and facts	720	1	5	2.54	1.212
Undermine democratic practices	702	1	5	1.83	.982
Improve information dissemination to external stakeholders and citizens	719	1	5	3.99	.878
Reduce clarity about what citizens want	706	1	5	2.02	.983
Increase opportunity to interact and collaborate with other government officials	718	1	5	3.75	1.000
Increase access to government services	723	1	5	3.97	.906
Enable feedback on service quality	721	1	5	3.90	.934
Increase certainty about the importance of the work I do	714	1	5	2.96	1.138
Enhance citizen trust of government	717	1	5	3.09	1.072
Increase conflict with citizens	712	1	5	2.11	1.019
Improve efficiency and lower costs of the department	715	1	5	3.29	1.081

Based on the Varimax Principal Component Analysis with Normalization, 15 items load onto 4 factors: *Participation Input Processes; Reduced Democratic Governance; Efficacy and Public Perception, and Decision Making Outcomes*, shown in Table 8.

Table 8: Results: Factor Analysis for Perceived E-participation Outcomes

	Participation Input Processes	Reduced Democratic Governance	Efficacy and Public Perception	Decision-Making Outcomes
Increase access to government services	**.835**	-.065	.218	.162
Enable feedback on service quality	**.791**	-.002	.320	.131
Improve information dissemination to external stakeholders and citizens	**.778**	-.088	.069	.216
Increase opportunity to interact and collaborate with other government officials	**.738**	-.113	.266	.123
Undermine democratic practices	-.091	**.817**	-.072	-.080
Distort political information and facts	.207	**.766**	-.248	-.145
Increase conflict with citizens	-.016	**.743**	.030	-.068
Reduce clarity about what citizens want	-.218	**.616**	.175	-.012
Increase uncertainty for my organization	-.166	**.603**	-.183	.328
Increase certainty about the importance of the work I do	.208	.062	**.828**	.117
Enhance citizen trust of government	.259	-.165	**.758**	.175
Improve efficiency and lower costs of the department	.355	-.066	**.537**	.186
Lead to better policies	.274	-.056	.264	**.847**
Improve governmental decision-making	.329	-.069	.207	**.841**
Initial Eigenvalues	4.782	2.428	1.168	1.027
% of Variance	34.158	17.340	8.340	7.334

The first factor, *Participation Input Processes*, has an Eigenvalue of 4.728. There are four items that load onto this factor, reflecting the belief that technologies lead to increased provision of, access to, and feedback on government services, increased interaction and collaboration with government, and revitalize public debate (Cronbach's Alpha=.860). The second factor, *Reduced Democratic Governance Outcomes,* has an Eigenvalue of 2.428. There are five items that load onto this factor, reflecting the perceptions that, for citizens, technologies lead to increased conflict and reduced clarity about citizen preferences, and for government, increased uncertainty and distortion of political facts, and undermine democratic practices (Cronbach's Alpha= .766). The third factor, *Efficacy and Public Perception*, has an Eigenvalue of 1.168. There are three items that load onto this factor, reflecting perceptions that technologies increase government self-efficacy, efficiency, and citizens' trust (Cronbach's Alpha= .722). Finally, *Decision Making Outcomes* has an Eigenvalue of 1.027. Two items load onto this factor, reflecting the perception that technologies lead to better policies and decision-making (Cronbach's Alpha= .900).

Centralization, formalization, and municipal department represent characteristics of a bureaucratic or traditional organizational structure for public organizations. Following Li and Feeney (2012), organizational *Centralization* is measured as the average of responses to the following three survey items: (1) there can be little action taken here until a supervisor approves a decision; (2) in general, a person who wants to make his own decisions would be quickly discouraged in this agency; and (3) even small matters have to be referred to someone higher up for a final answer (Cronbach's $\alpha = 0.776$). *Formalization* is the average of responses to two survey items: (1) Our organization has clear policies about public provision of docs and data that all employees must follow, and (2) Our organization has recommended guidelines or best

practices for public provision of documents and data (Cronbach's α = .772). Response categories

for *Centralization* and *Formalization* are a 5-point Likert-scale of agreement, (1=strongly

disagree, 2=disagree, 3=neither agree nor disagree, 4=agree, and 5=strongly agree), with higher

values representing greater centralization and formalization. The municipal department is

measured using five dummy variables: *Mayor's Office*, *Community Development Department*,

Finance Department, *Parks and Recreation Department*, and *Police Department*.

5.5.2.2 Institutional Factors

This research also explores the influence of three types of institutional pressures on e-

government adoption: coercive, normative, and mimetic. This study uses five variables to

capture the institutional pressures, as discussed in this section.

Coercive Pressures

Coercive pressures include having a legal requirement for citizen input (*Legal*) and

perceptions of the extent of influence of government stakeholders (*GovInfluence*). *Legal* is

measured as whether or not the department has a legal requirement to include citizens in the

policy-making process, based on responses to the survey question: *Is your organization legally*

required to include citizen input in policy-making activities? Response options are dichotomous,

where 0 indicates there is no legal requirement and 1 indicates there is a legal requirement.

GovInfluence represents the mean response to a set of items that asked respondents to

indicate the level of influence that the governor, state legislature, state courts, and federal

governments (Cronbach's α =.814). Response categories for each questionnaire item were on a 5

point Likert-type scale where included 1=no influence; 2=mild influence; 3=moderate influence;

4=strong influence; and 5=very strong influence.

Normative Pressures

Professional association membership (*ProfAssoc*), the form of government (*Mayor-Council)*, and non-governmental stakeholder influence (*Non_GovInfluence*) represent normative pressures. *ProfAssoc* is the response to the survey questionnaire that asks, "Do you belong to a professional association?" Responses are coded 1 for Yes and 0 for No. *Mayor-Council* is measured as whether or not the city has a mayor-council (=1) or council-manager (=0) form of government.

Non-governmental influence *(Non_GovInfluence)* is operationalized using four variables to determine the influence of non-governmental stakeholders or civil society on adoption behavior (Wang & Feeney, 2014; Li & Feeney, 2012; Oliveira & Welch, 2013). Non-governmental stakeholder influence is the mean of responses on the level of influence exerted by business groups, advocacy groups, public opinion, and the media (Cronbach's α =.837). Respondents were asked to indicate the level of influence that the institutions or individuals exert over their organization. Response categories for each questionnaire item were on a 5 point Likert-type scale and include 1=no influence; 2=mild influence; 3=moderate influence; 4=strong influence; and 5=very strong influence.

Mimetic Pressures

Mimetic pressures relate to mimicking the adoption behavior of cities within same U.S. geographic region. The variable, *Region,* is measured as the average number of e-participation ICTs adopted by municipalities within the same region (Jun & Weare, 2010; Reddick & Norris, 2013). Municipalities are assigned to one of nine regions based on the descriptions from the U.S. Census Bureau including New England, Middle Atlantic, East North Central, West North

Central, South Atlantic, East South Central, West South Central, Mountain, and Pacific. The

mean adoption for research suggests that jurisdictions in the West and South are more likely to

adopt because they are more likely to have more professional management (Reddick & Norris,

2013). The descriptive statistics for the mean adoption by U.S. region are shown in Table 9.

Table 9: Mean adoption of e-participation by U.S. Region

US Census Region	N	Mean Adoption of E-Participation ICTs
New England	43	3.333
Middle Atlantic	24	2.696
East North Central	170	3.561
West North Central	76	4.543
South Atlantic	120	4.775
East South Central	30	4.143
West South Central	83	4.704
Mountain	86	4.813
Pacific	213	3.877

5.5.2.3 Environmental Factors

This research includes four environmental variables. Drawing from research on the digital divide, demographic variables serve as a proxy for demand for e-government ICTs, as higher educated, White, and more wealthy citizens tend to demand these services (Mossberger & Jimenez, 2009). *Education* represents the percentage of the city's population with a bachelor's degree (Jun & Weare, 2010; Ahn, 2011; Macintosh, 2004; Sæbø et al., 2008). *White* represents the percentage of the city's population that are identified as White (Ho, 2002). *Income* indicates the log of the city's per capita income (Ho, 2002). The variable, *Population*, is measured as the log of the city's population based on data from the U.S. Census Bureau (Ahn, 2011; Moon, 2002). Table 10 shows descriptive statistics for all variables.

Table 10: Descriptive Statistics for Study Variables

Variables	N	Minimum	Maximum	Mean	SD
Dependent Variable					
E-Participation	775	0	21.0	4.120	3.811
Organizational Factors					
E-Communication	790	0	24.0	6.596	4.054
E-Services	705	0	4.0	2.497	1.299
Web Content & Design					
Privacy Statement	845	0	1.0	.6473	0.478
Search Bar	843	0	1.0	.9193	0.272
Law Index	839	0	1.0	.9654	0.183
Page Date	835	0	1.0	.0551	0.228
Site Index	843	0	1.0	.3025	0.460
Non English	843	0	1.0	.2183	0.413
Data Security Policy	718	1	5.0	3.744	0.994
Internal IT Management	766	0	1.0	0.927	0.260
Manager Perceptions					
Decision Making	732	1	5.0	3.312	0.896
Input Process	732	1	5.0	3.703	0.738
Efficacy	724	1	5.0	3.110	0.880
Reduced Democratic Governance	731	1	4.5	2.138	0.793
Department					
Mayor/Administrator's Office	845	0	1.0	.1704	0.376
Community Development	845	0	1.0	.2213	0.415
Finance	845	0	1.0	.1562	0.363
Parks & Recreation	845	0	1.0	.2130	0.410
Police	845	0	1.0	.2391	0.427
Centralization	697	2	15	7.108	2.179
Formalization	717	1	5	3.985	0.809
Institutional Factors					
Legal Requirement	718	0	1	0.476	0.500
GovInfluence	692	1	5	2.890	0.739
Non-GovInfluence	705	1	5	2.684	0.756
Professional Association Membership	695	0	1	0.910	0.293
Council-Manager Form of Govt.	845	0	1	0.730	0.444
Environmental Factors					
Regional Adoption	845	2.7	4.81	4.126	0.571
% Population White	845	6.3	96.6	74.018	17.861
% Population with Bachelor's Degree	845	6	79	32.032	14.953
Per Capita Income	844	9.35	11.14	10.193	0.313
Population	845	10.14	12.43	11.144	0.647

5.6 Methods

In this study, I use a variety of methods to answer the research questions and test the hypotheses outlined in this dissertation. Specifically, I explore the extent of e-participation adoption among U.S. municipalities, differences in adoption across municipal functional roles, and the extent to which organizational, environmental, and institutional factors predict e-participation adoption. Univariate descriptive statistics and bivariate correlation analyses are conducted in order to understand the basic characteristics of the data. These procedures were also used to understand the extent of e-participation adoption.

Next, I used the Kruskal-Wallis test to determine whether there were statistically significant differences in adoption across municipal functional roles. The Kruskal-Wallis test is a non-parametric alternative to the one-way ANOVA and may be used when the data violates the assumptions of ANOVA. One key assumption of ANOVA is that the dependent variable is normally distributed for each group of the independent variable. I tested for normality and confirmed that the data violated the assumption of normality based on the results of the Shapiro-Wilk's test ($p < .05$). Because the p value was less than .05, I rejected the null hypothesis that the data were normally distributed, thereby justifying the use of non-parametric tests.

While descriptive statistics and group comparisons are useful for understanding the extent and differences in adoption behavior, they do not allow us to control for organizational, environmental, and institutional factors that may influence adoption. Therefore, I estimated a model of e-participation using negative binomial regression in order to determine the predictors of adoption in U.S. municipalities, controlling for factors where possible.

5.7 Model Fit

Because the outcome variable, E-Participation, is count scale measured as the number of

ICTs adopted, a model of e-participation is estimated using negative binomial regression with

robust standard errors. Ordinary Least Squares (OLS) regression is not appropriate for modeling

count data because this method takes the log of zero, which is undefined, thereby resulting in a

loss of data and biased estimates (Long & Freese, 2006). Also, modeling count data with OLS

can produce negative predicted values that are illogical (Gardner, Mulvey, & Shaw, 1995).

Poisson and negative binomial regression are more appropriate for modeling count data because

they take into account the nonlinear distribution of the data and the non-negative nature of count

data.

In order to determine which count model is most appropriate, I measured the distribution

of the data using a Pearson Chi-Square goodness-of-fit test and exploratory Poisson regression

models. A statistically significant result from the Pearson Chi-Square goodness-of-fit tests would

indicate a poor model fit, suggesting that the negative binomial regression is the appropriate

choice to analyze the data. The Pearson goodness-of-fit tests results indicate that the distribution

of e-participation adoption does not fit the Poisson distribution. A Poisson distribution has an

equal mean and variance. For this research, the dependent variable E-Participation has an

unequal mean and variance ($\mu=4$; $\sigma=14$), suggesting that Poisson regression is not an appropriate

method for estimation. Also, because the p value is below the standard threshold of 0.05 (prob >

chi= 0.000), negative binomial regression is a more appropriate method of estimation for the

data. Descriptive statistics reveal that the sample mean of 4.12 is not equal to the variance of

14.52. In addition, a histogram reveals that the data are strongly skewed to the right, indicating

over-dispersion. These characteristics underscore the choice of negative binomial regression as the appropriate method for estimating e-participation adoption (Long & Freese, 2006).

Count model coefficients model the log of incident counts, making interpretation more difficult. Rather than reporting results as regression coefficients, I interpret the negative binomial regression in terms of Incidence Rate Ratio (IRR). IRR can be expressed as the difference of the log of expected counts and can be interpreted as an incidence rate (Long & Freese, 2006), expressed as the impact that 1 unit increase in the independent variable has on the rate at which local governments adopt e-participation ICTs allowing for ease of interpretation. I analyzed the data using SPSS version 23 and Stata/SE 14.0.

6. RESULTS AND DISCUSSION

This dissertation attempts to answer the research questions related to the extent of e-participation ICT adoption and the predictors of adoption of e-participation ICTs among U.S. municipalities. Accordingly, this chapter discusses the results of the empirical analysis and includes a discussion of the implications of each finding. The chapter begins with a discussion of the results of univariate and bivariate analyses that investigate the extent of e-participation adoption and comparison of technology adoption across groups. The chapter then details the results of the regression analysis, estimating a model of e-participation adoption. The results of hypothesis testing are discussed and statistically significant findings are highlighted. Finally, the chapter concludes with a summary of the results.

6.1 The Extent of E-Participation Adoption

In order to predict e-participation adoption behavior in U.S. municipalities, it is necessary to understand the nature and extent of e-participation ICTs. Univariate analysis of survey data and observations from municipal websites help describe the extent to which municipalities have adopted e-participation ICTs and the extent to which website designs are accessible and usable, thereby enabling participation.

From the survey responses, I developed the variable, *E-participation,* which is the variable of interest in this study. It represents a composite of ICTs adopted for the purpose of facilitating participation with citizens. The minimum response is 0 and the maximum response is 21 ICTs, out of 26 possible ICTs. The results of univariate analysis are shown in **Figure 4** and indicate that the majority of municipalities offer e-participation ICTs online but few offer a range of those ICTs. Only 11.6 percent of the municipalities in the study sample use at least one e-

participation ICT. Approximately 43 percent use between zero and two ICTs to facilitate

participation while nearly 18 percent use none of the twenty-six possible technologies to

facilitate participation. While the absolute number of ICTs adopted is not the focus of this

research, greater numbers of adoption represent increased opportunities for citizen access to

government decision-makers and policy processes. A greater percentage of the municipalities in

this study provide few to no options for participation, limiting citizens' democratic potential

online.

Figure 4: Frequency Distribution for E-Participation Adoption
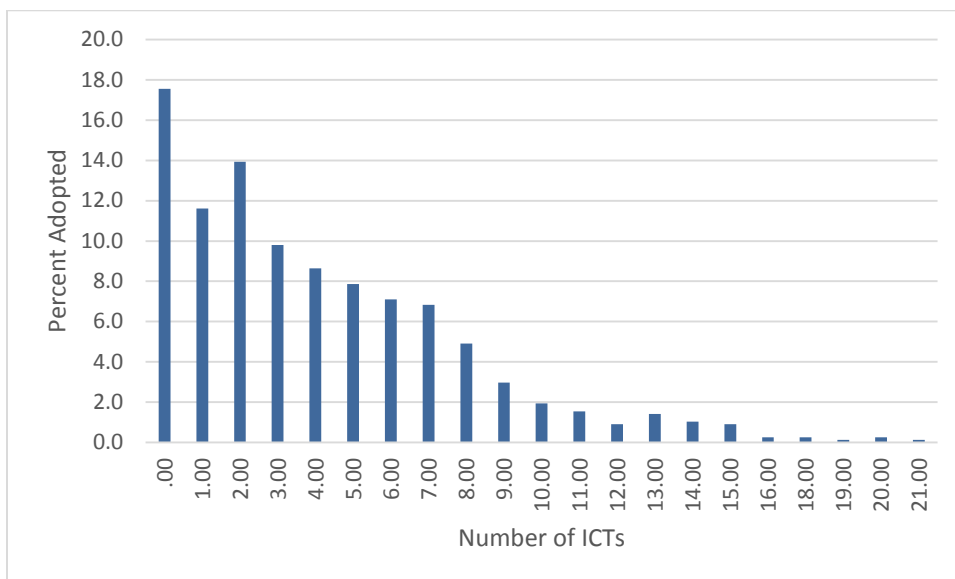
The results of this study are comparable to those of previous studies. For example, the results of a 2007 study of Italian local governments indicate that 93 percent had not adopted ICTs to facilitate e-participation (Medaglia, 2007). In addition, it underscores other scholars' findings that e-government expansion, particularly the adoption of higher level ICTs, is incremental with few governments adopting technologies that facilitate participation through dialogue with government and among citizens (Reddick & Norris, 2013).

In this research, I make the distinction between technology types, acknowledging the capacity-building potential of some ICTs that may influence adoption. Therefore, comparing adoption behavior across ICT types is helpful to evaluate the progress e-government adoption. E-services (ICTs to provide services online) and e-communication (ICTs to disseminate information to citizens) technologies are two independent variables in this study. They may be less risky and require fewer resources to adopt, compared with e-participation ICTs. E-participation adoption lags slightly behind the adoption of e-services and e-communication ICTs, e-services counts range from 0 to 4, out of 4 possible ICTs, and e-communication responses range from 0 to 24 out of 26 possible ICTs. For e-services adoption, the frequency distribution is skewed to the left, with more municipalities adopting a higher number of e-services. Approximately 24 percent of municipalities adopted all four e-services ICTs. E-communication has a right skewed frequency distribution, with a greater number of municipalities adopting fewer ICTs. E-participation frequency distribution is also right skewed, but a greater number of municipalities adopt no ICTs and a smaller range of ICTs, compared to e-communication and e-services adoption as shown in **Figure 5**. These findings are consistent with those of Reddick and Norris (2013), who find greater adoption of information and service related ICTs among local governments.

Figure 5: Non-Adoption by Technology Type
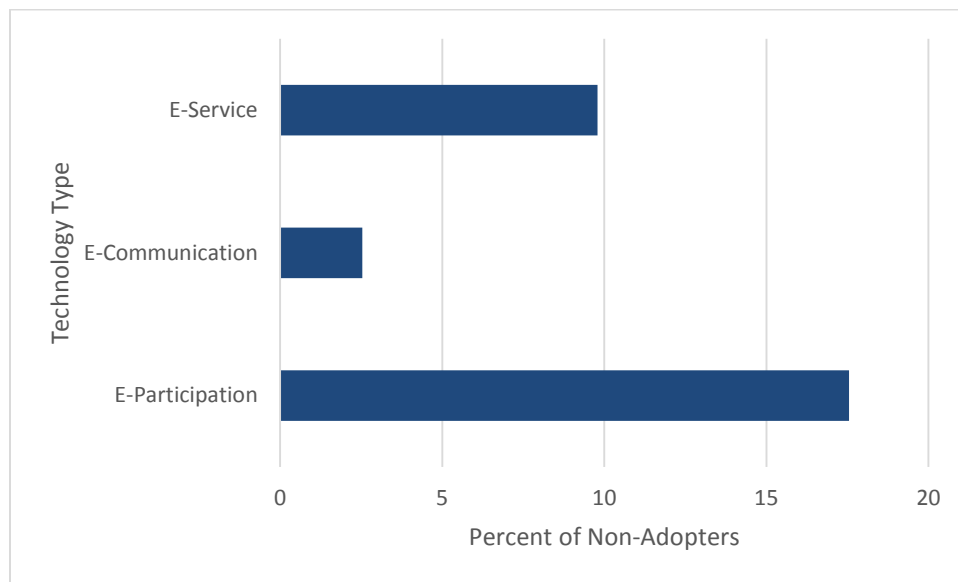
I used data about U.S. municipal website content and design in order to answer the research question: *To what extent do municipal websites promote electronic engagement and participation?* From the municipal website observations, I find six features offered on municipal websites that enable accessibility and usability. Six criteria characterize accessibility and usability and include: 1) Displays privacy statement/ policy or disclaimer with a privacy section, 2) Is there a searchable database/search bar, 3) Provides a searchable index or list for archived laws, regulations, and requirements, 4) Provides published date on main page, 5) Statement or advertisement declaring that the site is development or maintained by an outside contractor, and 6) Provides access to non-English speakers.

From the univariate analysis, I find that just 5 percent of municipality websites offer all six accessibility and usability features, with 40 percent offering three of the six features.

Conversely, few municipalities offer only one feature. This suggests that municipal website designs are moderately accessible and usable, enabling citizens to easily access and navigate websites and locate information. Municipal websites most often provide a searchable database (95 percent), searchable index or list for archived laws, regulations, and requirements (90 percent), or displays a privacy statement or policy (59 percent). However, just 6 percent of municipalities ensure that the website content is timely by providing a published date on the main page. Only 21 percent of the municipalities provide accommodations for non-English speaking users. This website feature is critical to equity in access to participation because citizens whose primary language is not English will likely encounter difficulties performing other transaction and information related business with the government due to the language barrier. Therefore, the lack of adoption of this website feature has can negatively impact e-service and e-communication, as well as e-participation initiatives. Figure 6 illustrates the frequency distribution for website accessibility and usability. Figure 7 illustrates the frequency distribution of the six website features that compose website accessibility and usability.

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Figure 6: Frequency Distribution of Web Accessibility and Usability Features
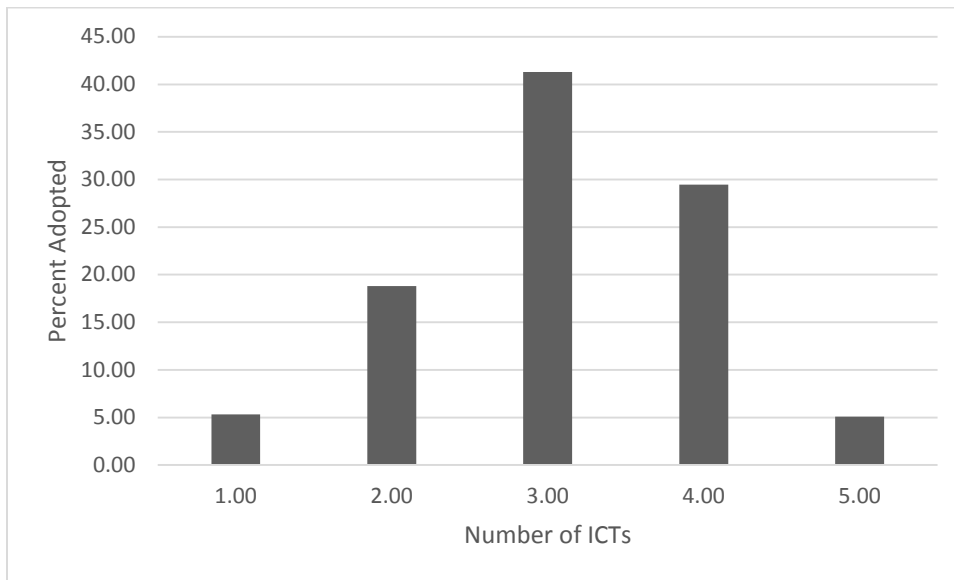
Figure 7: Frequency Distribution of Web Evaluation Criteria
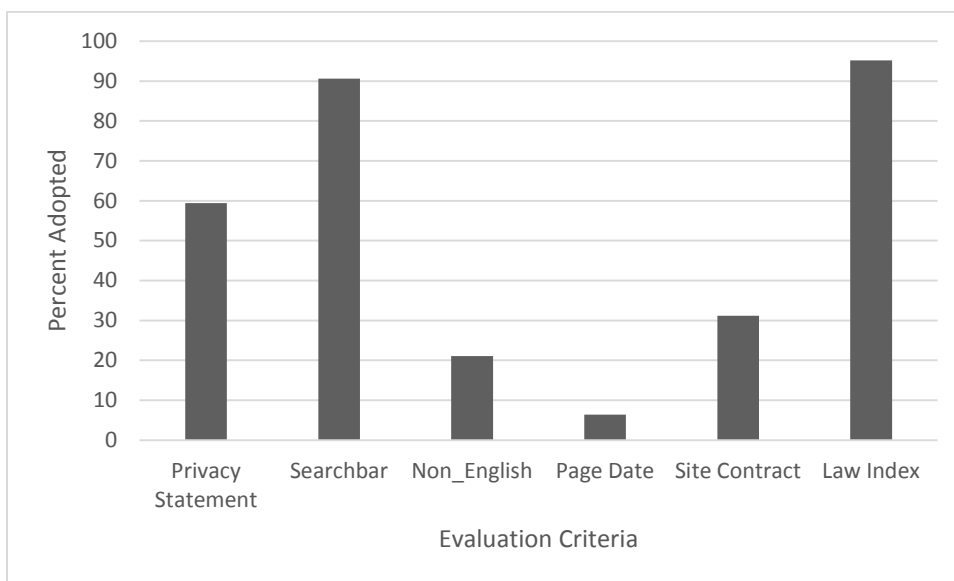
In summary, I found moderate adoption of e-participation ICTs and moderate municipal website development in terms of accessibility and usability features. The findings discussed in this section echo previous studies (Medaglia, 2007; Reddick & Norris, 2013; Reddick & Norris, 2013; Zheng et al., 2014), suggesting that the adoption of e-participation is limited and incremental and that e-government development reflects an emphasis on traditional ICTs rather than transformative ones.

6.2 Differences in E-Participation Adoption Across Government Departments

The research question asks: *Do differences in municipal functional roles influence e-participation adoption?* Using the Kruskal-Wallis Test, I tested differences in e-participation adoption across five U.S. municipal departments including Mayor or Administrator Office (n=138), Community or Economic Development Department (n=174), Finance Department (n=117), Parks and Recreation Department (n=164), and Police Department (n=182). The distributions of e-participation adoption were similar for all departments as determined by a visual inspection of the boxplots as shown in **Figure 8**. The difference in median adoption was statistically significant between the various departments, $x^2(4) = 19.723$, $p = .001$. **Table 11** shows the values for the median adoption of e-participation ICTs across municipal departments.

Figure 8: Boxplot Distribution of Median E-Participation Adoption by Department
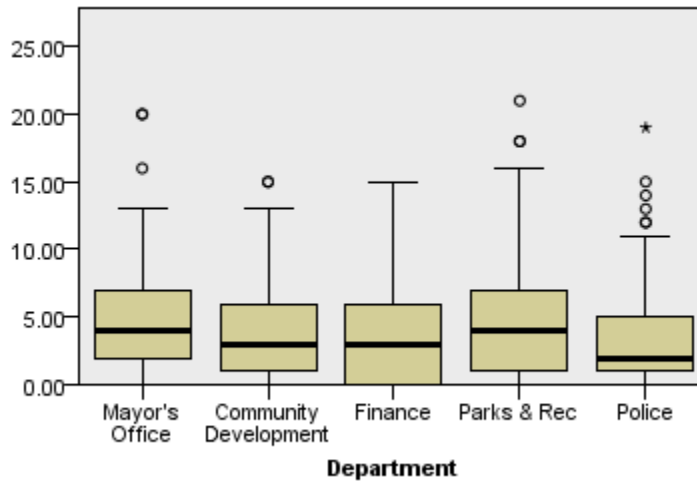
Table 11: Median E-Participation Adoption of Municipal Departments

Department	N	Median
Mayor's Office	138	4.0
Community Development	174	3.0
Finance	117	3.0
Parks & Rec	164	4.0
Police	182	2.0
Total	**775**	**3.0**

The results show that the Kruskal-Wallis H test is statistically significant (p=.001). This suggests that the median of at least one group is different from the median of another group. Post hoc tests are necessary to determine *which* groups are different. To do so, I conducted pairwise comparisons using Dunn's (1964) procedure with a Bonferroni correction for multiple comparisons and adjusted *p* values are presented. The post hoc analysis, shown in Table 12, reveals statistically significant differences in e-participation adoption between Police (Mdn = 2.0) and Parks and Recreation (Mdn = 4.0) (*p* = .019), Police and Mayor's or Administrator's Office (Mdn = 4.0) (*p* = .007), and Finance (Mdn = 3.0) and Mayor's or Administrator's Office (*p* = .03). I found no statistically significant difference between the Community or Economic Development department (Mdn = 3.0) or any other group combinations. The results indicate that differences in municipal functional roles matter for adoption.

Table 12: Kruskal-Willis Post Hoc Test Results

Department	Test Statistic	Adj. Sig.
Police-Finance	2.529	1.000
Police- Community Development	23.201	1.000
Police- Parks & Rec	74.428	0.019
Police-Mayor's Office	85.535	0.007
Finance-Community Development	20.672	1.000
Finance-Parks & Rec	-71.899	0.076
Finance- Mayor's Office	83.007	0.030
Community Development -Parks & Rec	-51.227	0.344
Community Development -Mayor's Office	62.334	0.140
Parks & Rec-Mayor's Office	11.107	1.000

(n=775)

6.3 Predictors of E-Participation Adoption

The primary research question asks: *How do organizational, environmental, and institutional factors influence the adoption e-participation ICTs, among U.S. municipalities?* Using negative binomial regression, I tested approximately seventeen hypotheses about the relationship between organizational, institutional, and environmental variables and e-participation adoption. The hypothesis testing results are shown in Table 13 and the results of the statistical analysis are shown in

Table 14.

6.3.1 Organizational Factors

The first two hypotheses address the secondary research question: *What is the extent to which the adoption of e-service and e-communication ICTs influence the adoption of e-participation ICTs?* First, I predict that greater adoption of e-communication technologies is positively associated with the adoption of e-participation technologies (H_1). The results yield strong support for the hypothesis as there was a positive and statistically significant relationship between e-communication adoption and e-participation ICT adoption. For each unit increase in

e-communication adoption, there was 1.11 increase in e-participation adoption (p≤ .01). Thus, municipal governments that use e-communication ICTs are more likely to use e-participation ICTs. This finding supports the logic that e-communication ICTs may help build the technical capacity and expertise required to manage and support e-participation ICTs. Because social media and other ICTs may be used for both information dissemination and participation facilitation, using these ICTs for information dissemination or communication allows managers to acquire knowledge, experience, and comfort with the using technology in a before progressing to using it for participation facilitation.

The results show moderate support for the second hypothesis that predicts a positive association between greater adoption of e-services technologies and the adoption of e-participation technologies. For each unit increase in e-service adoption, there was 1.05 unit increase in e-participation adoption (p≤ .05). These findings support the claim that as with e-communication technologies, e-services ICTs may help build technological infrastructure and human capacity necessary to handle more technically complex technologies like e-participation. The findings in this study echo those of a recent study (Zheng et al., 2014) that found a positive and statistically significant association between the adoption of e-service and e-participation among New Jersey municipalities. As suspected, both e-communication and e-services are important for e-participation, and municipalities that embrace e-participation are more likely to also embrace these ICTs.

There is no support for hypotheses 3 and 4, which make predictions about management strategies, data security policies and internal IT management and the adoption of e-participation ICTs. There is no support for hypothesis 3, which predicted that having a clear security policy to ensure citizen privacy is positively associated with the adoption of e-participation technologies.

Also, I find no support for hypothesis 4 that predicting that having internal IT management would be positively associated with the adoption of e-participation ICTs. These findings suggest that perhaps management strategies like privacy policies are a response to moving government online in general rather than an antecedent to e-participation adoption specifically. Municipalities that offer transaction-based services online may develop privacy policies in order to build trust with citizens. Therefore, developing privacy policies may not be a strategy that is exclusive to e-participation ICT adoption. Having an internal IT department may not be an antecedent of e-participation adoption but rather it may reflect the greater technological capacity and demands of the municipality.

Hypothesis 5 predicted a positive relationship between positive perceptions of technology outcomes and e-participation adoption. The factor analysis revealed that manager responses loaded on four factors including 15 items load onto four factors: *Participation Input Processes; Reduced Democratic Governance; Efficacy and Public Perception, and Decision Making Outcomes*. The first factor, *Participation Input* reflects the belief that technologies lead to increased provision of, access to, and feedback on government services, increased interaction and collaboration with government, and revitalize public debate. The second factor, *Reduced Democratic Governance Outcomes,* reflects the perception that, for citizens, technologies lead to increased conflict and reduced clarity about citizen preferences, and for government, increased uncertainty and distortion of political facts. These represent negative perceptions of e-participation outcomes. The third factor, *Efficacy and Public Perception*, reflects perceptions that technologies increase government self-efficacy, efficiency, and citizens' trust. Finally, *Decision Making Outcomes* reflects the perception that technologies lead to better policies and decision-making (Feeney & Welch, 2012).

I find moderate support for Hypothesis 5, as the results are mixed. More positive perceptions of *Decision Making Outcomes* are positively association with e-participation adoption (p≤ .05). *Participation input processes* is negatively related to e-participation adoption, although the relationship is not statistically significant. The relationship between *Reduced Democratic Governance Outcomes* and e-participation adoption is negative. That is, managers with more negative perceptions about outcomes related to reduced democratic governance are less likely to adopt e-participation ICTs (p ≤ .05). Surprisingly there is no statistically significant relationship between *Efficacy and Public Perception* and e-participation. It seems that perceptions about the effects of participation on better policy and decision-making and clarity about citizens' preferences are stronger predictors of adoption behavior, than perceptions about the effects on interaction and public debate and efficiency and citizen trust.

These findings somewhat support a prior study (Feeney & Welch, 2012) that examined how e-participation influenced perceived technology outcomes of the same population but for a different year. The researchers find a positive relationship between *participation input processes*, the relationships between *decision-making outcomes* and *reduced democratic governance* outcomes are negative. A possible justification for the difference in results is that in their research design e-participation is a predictor of managers' perceptions of technology outcomes. In this study, e-participation is the dependent variable. Also, there is a difference of two years between the two surveys used in the studies. Perhaps managers' perceptions of technology related outcomes evolved as technology and its use in U.S. municipalities evolved.

Another research question seeks to determine whether differences in municipal functional roles influence e-participation adoption. Specifically the hypothesis predicts that police and finance departments are negatively associated with adoption. Surprisingly, there is no

support for this hypothesis. Using dummy variables with the Mayor's or Administrator's Office as the comparison variable, all departments are positively associated with the outcome variable. There is no statistically significant relationship between and any department and e-participation adoption.

I initially expected, because of the nature of municipal finance departments, that there is little need to engage with the public for the purpose of participation. As a result, municipal finance departments are more likely to post information tax and finance related information online in efforts to promote transparency, but not necessarily soliciting citizen feedback or participation in decision-making processes. However, the relationships between all departments and e-participation adoption are positive. Since none of the findings related to municipal departments is statistically significant, the finding suggests that municipalities may be embracing and moving toward an enterprise approach to technology use in order to achieve efficiencies such as economies of scale and the standardization of common processes across the government unit rather than within departments. The result is an integrated e-government that values IT and e-government as a business standard.

Hypotheses 7 and 8 make predictions about the relationship between organizational structures and e-participation adoption. The findings do not support the hypothesis that formalization is positively related to the outcome variable nor the hypothesis that centralization is negatively related to the outcome variable. While the direction of the relationship is as expected, neither relationship is statistically significant. Again, this finding may be the result of municipalities moving toward joined up government. As IT becomes institutionalized across government, e-government processes and policies become more standardized and common

across government. As a result, there is less of a distinction between processes required for specific ICTs.

Based on the socio-technical perspective, the design and content of municipal websites represent the user experience and interaction with government online and may be important facilitators or hinderers of participation online. Therefore, hypothesis 17 makes predictions about the extent to which municipal websites promote engagement and participation online.

Six website features capture municipal website accessibility and usability; 1) displays privacy statement/ policy or disclaimer with a privacy section; 2) provides a searchable database/search bar; 3) provides a searchable index or list for archived laws, regulations, and requirements; 4) provides published date on main page; 5) statement or advertisement declaring that the site is development or maintained by an outside contractor; and 6) provides access to non-English speakers. Privacy statement, law index, current page date, and site index are all positively associated with e-participation adoption, but the relationship is not statistically significant. Having a search bar is negatively associated with e-participation adoption, but the relationship is not statistically significant. Only the provision of access for non-English speakers is positively and significantly associated with e-participation adoption. Non-English access increases e-participation adoption by 1.13 (p< .10). Contrary to expectations, the results demonstrate that the accessibility and usability measures I use have little influence on e-participation adoption. Municipalities with user-friendly websites are more likely to adopt e-participation ICTs because having a user-centered municipal website improves the ease in which citizens find, access, and use information. However, these features that allow citizens to find information online may not matter for enabling participation, particularly if participation and engagement are not the goals of the municipal website.

6.3.2 Institutional Factors

Hypotheses 9 and 10 make predictions about the influence of coercive institutional pressures on the adoption of e-participation technologies. Hypothesis 8 predicts that having a legal requirement for participation is positively associated with the e-participation. The results support this hypothesis. Legal requirement is a dichotomous variable, and when there is a legal requirement for participation, it results in a 1.14 unit increase in e-participation adoption ($p < .10$). The relationship between perceived pressures from government and e-participation adoption is negative, as expected, but the relationship is not statistically significant. These findings are not surprising. Municipal governments that are subject to greater influence from government stakeholders may be pressured to appease and comply with government requirements, particularly higher levels of government on which they depend for financial resources. Under such pressure, those municipalities refrain from engaging in and adopting riskier, more costly, and perhaps, experimental technologies.

Hypotheses 11, 12, and 13 make predictions about the influence of normative institutional pressures on e-participation adoption. I expected that non-governmental institutional pressures and professional association membership has a positive association with e-participation adoption, while form of government is negatively associated with adoption. The factors perform as expected. Institutional pressures from non-governmental stakeholders are not statistically significant predictors of e-participation adoption. Pressures from groups like the media, advocacy groups, and businesses do not have significant influence over adoption behavior in municipalities in the study sample. However, normative pressures stemming from professional association membership has a strong, positive influence on e-participation adoption ($p \leq .01$). Professional associations offer training and resources related to technology. Associations also

connect member municipalities, and set the expectations about what is acceptable behavior. Municipal government practices may resemble normative behaviors in order to satisfy those expectations and gain legitimacy.

As expected, having a council-manager form of government, has a strong negative influence on the outcome variable ($p \leq .05$), compared to mayor-council forms of government. This finding supports the argument that professional municipal governments may value efficiency, which tends to conflict with participation. On the contrary, mayor-council forms of government may have an electoral incentive to adopt e-participation ICTs, as doing so may enhance public perception and citizen satisfaction with government, and ultimately, gain votes. This finding contradicts the work of earlier scholars (Li & Feeney, 2012; Moon, 2002) regarding the influence of form of government on technology adoption, these studies do not examine e-participation adoption. Zheng et. al (2014) study e-participation and find that mayor-council forms of governments are more likely to foster participation compared to council-manager and township forms of government. These findings support the argument that mayor-council forms of government have political interests in participation and therefore, are more likely to provide access to government online (Zheng et al., 2014, p.658).

Mimetic pressures in the form of regional adoption do not have a statistically significant influence on adoption behaviors. Compared to mimetic pressures, coercive and normative institutional pressures have a greater influence on adoption behavior. This finding suggests that sources of coercive and normative pressures have resources such as funding and training that are vital for municipality success and survival. Sources of mimetic pressures do not exert influence by providing or withholding resources, thereby reducing the importance of their influence on

adoption behavior. Instead, municipal government practices may be shaped by these sources of pressures that have a direct stake in their condition or survival.

6.3.3 Environmental Factors

Based on the work of previous scholars, three sociodemographic variables are used to conceptualize the digital divide and characterize the external environment in which municipal governments are situated. Cities with higher percentages of whites in the population, income, and education tend to have greater adoption of the Internet, thereby reducing the digital divide. As a result, I expect that municipalities with a smaller digital divide, or greater access to the Internet, will have a greater demand to participate in government online. Although all of the variables perform as expected, none of them are statistically significant. Citizens' individual characteristics including race, income, or education do not predict municipal adoption behavior. Municipalities appear to value either all citizen participation or no citizen participation, rather than that of a particular demographic.

A fourth environmental variable, population, can be a proxy for government size. I expect that larger populations are positively associated with e-participation adoption because they have incentives to adopt e-participation ICTs. In smaller municipalities, face-to-face interactions may be more feasible and therefore, may occur more frequently and may be less costly, compared to larger municipalities (Medaglia, 2007, p. 275). However, my findings do not support this hypothesis (H_{16}) hypothesis. I find that larger municipalities reduce e-participation adoption by 0.98 and the relationship is not statistically significant. This finding contradicts earlier studies regarding the impact of municipal size on adoption behavior. However, the finding supports a more recent study of e-participation in New Jersey municipalities that found a negative relationship between municipal size and e-participation adoption (Zheng et al., 2014). Municipal

size may no longer perform as expected because, compared to smaller municipalities, larger

municipalities may have greater diversity and geographical dispersion among its citizens. This

may make it more difficult to have municipal-wide e-participation initiatives despite access to

financial and human resources.

Table 13: Hypothesis Testing Results

	Variable	Proposed Relationship with E-Participation	Actual Relationship with E-Participation
H1	**E-Communication**	**Positive**	**Positive**
H2	**E-Services**	**Positive**	**Positive**
H3	Data Security Policy	Positive	Positive
H4	Internal IT Management	Positive	Negative
H5	Management Perception		
	Decision Making	**Positive**	**Positive**
	Participation Input Process	Positive	Positive
	Efficacy and Perception	Positive	Negative
	Reduced Democratic Governance	**Negative**	**Negative**
H6	Department	Negative	Mixed
H7	Centralization	Negative	Negative
H8	Formalization	Positive	Positive
H9	**Legal Requirement**	**Positive**	**Positive**
H10	Government Influence	Negative	Negative
H11	Non-Government Influence	Positive	Positive
H12	**Professional Association Membership**	**Positive**	**Positive**
H13	**Council-Manager Form of Govt.**	**Negative**	**Negative**
H14	Regional Adoption	Positive	Positive
H15a	% Population White	Positive	Positive
H15b	% Population with Bachelor's Degree	Positive	Positive
H15c	Per Capita Income	Positive	Positive
H16	Population	Positive	Negative
H17	**Web Accessibility and Usability**	**Positive**	**Mixed**

Note: Tests for **bolded** hypotheses were found to be significant at p< .05.

Table 14: Effects of Predictor Variables on Overall E-Participation Adoption

Independent Variables	IRR	SE	z-score
Organizational Factors			
E-Communication	1.117***	0.009	13.21
E-Services	1.057**	0.029	2.01
Website Accessibility and Usability			
PrivacyStmt	1.066	0.074	0.09
SearchBar	0.920	0.115	-0.07
LawIndex	1.352	0.281	1.45
PageDate	1.066	0.150	0.45
SiteIndex	1.051	0.065	0.80
Non_English	1.132*	0.077	1.81
Data Security Policy	1.013	0.034	0.38
Internal IT Management	0.928	0.116	-0.60
Manager Perceptions			
Decision Making	1.099**	0.051	2.02
Input Process	1.082	0.066	1.30
Efficacy	0.962	0.041	-0.92
Reduced Democratic Governance	0.917**	0.036	-2.18
Department (Mayor/Administrator's Office as contrast group)			
Community Development	1.031	0.100	0.32
Finance	1.008	0.115	0.07
Parks & Recreation	1.126	0.104	1.28
Police	1.089	0.114	0.82
Centralization	0.994	0.015	-0.42
Formalization	1.014	0.046	0.30
Institutional Factors			
Legal Requirement	1.146*	0.082	1.91
Government Influence	0.927	0.045	-1.55
Non-Government Influence	1.051	0.050	1.05
Professional Association Membership	1.389***	0.167	2.73
Council-Manager Form of Govt.	0.846**	0.066	-2.14
Regional Adoption	1.049	0.061	0.82

Table 14: Effects of Predictor Variables on Overall E-Participation Adoption (continued)

Independent Variables	IRR	SE	z-score
Environmental Factors			
% Population White	1.001	0.002	0.62
% Population with Bachelor's Degree	1.000	0.003	0.12
Per Capita Income (ln)	1.074	0.158	0.49
Population (ln)	0.981	0.050	-0.38
Log likelihood	-1301.306		
LN chi2(30)	508.15		
LN alpha	0.173		
N	566		
Pseudo R2	0.106		

*** p <.01; ** p <.05; *p <.10

Robust standard errors are used. Negative binomial regression lacks an overall model fit statistic equivalent to the R2 measure found in ordinary least squares regression. For ease of interpretation, independent variables effects are expressed in terms of incident rate ratios (IRR) rather than standard coefficients.

6.3 Summary of Results

Most variables in the model, with few exceptions, perform as expected in terms of their relationship with the outcome variable. Based on the results we can conclude that some variables within the categories of factors are stronger predictors of e-participation adoption than others. For example, we cannot make broad statements about the impact of institutional factors. Instead, we can say that certain institutional factors matter more than others. Contrary to prior scholars' findings, the organizational structure does not significantly influence adoption behavior. Both organizational structures perform as expected, but neither is statistically significant. This may be due to the ability of technology to transcend structural boundaries. Because technology is more common in organizations, the barriers that formalization creates are easily overcome using technology.

Across the categories of predictor variables, I find that environmental factors in the model tested in this research have the little influence on e-participation adoption. While all of the variables (with the exception of *population*) performed as expected, none shared a statistically significant relationship with the outcome variable. This suggests that adoption behavior is more greatly influenced by organizational factors such as technical and human capacity. Municipalities will likely not implement an e-participation initiative if they lack the organizational resources such as infrastructure, skills, and experience needed to successfully do so, regardless of the environmental conditions that suggest that they should. In addition, institutional pressures can directly influence adoption behavior because of the resources that the sources of pressure control and provide to municipalities. As a result, sources of institutional pressures that relate to resource dependency have a stronger influence on adoption behavior. The influence of mimetic pressures may be reduced because municipalities can learn about the usefulness, effectiveness, and success of ICT implementation through professional associations, training and education, and perhaps even in the private sector. Therefore, mimicry or imitation of successful implementers and leaders in innovation alone is not a sufficient justification for adopting ICTs. Finally, the influence of web design and content on e-participation is not as important as initially suspected. Accessible and usable web design reflects an emphasis on user-centeredness. User-centeredness is key to e-participation development and success since it enables access to the technology and policy process. However, the website features used in the model in this research may be more important for sharing information with citizens rather than enabling citizen participation.

7. CONCLUSIONS

The findings of this research provide empirical support for factors that influence the adoption of e-participation ICTs in U.S. municipalities. This research contributes to the literature on citizen participation online, and more broadly, the literature on technology development in government. This chapter begins with a review of the purpose and findings of this research. Next, I present the contributions and implications. The chapter concludes with a discussion of the strengths and limitations of the research and directions for future research

7.1 Review

In the U.S., e-government development is progressing towards greater levels of interaction between government and citizens. ICTs allow governments to efficiently share information and provide services to citizens. For citizens, ICTs provide multiple access points to government decision making and the policy process. Despite the advantages e-participation and the growth of ICT and Internet use in U.S. society, recent research finds that governments are much slower to adopt e-participation ICTs. Barriers to adoption such as lack of resources like infrastructure and expertise are cited, but few scholars examine the predictors of e-participation at the municipal level of government. Using technology enactment, institutionalism, models of e-government development as theoretical frameworks, this research elucidates the influence of organizational, institutional, and environmental factors on adoption behavior in U.S. municipalities. While some findings confirm previous work in this area, others challenge what we know, and still others reveal new aspects of e-participation development in the U.S.

The findings support previous research (Moon & Norris, 2005), suggesting that managers' perceptions are important predictors of adoption behavior. However, not all

perceptions are equally influential. Findings from this study sample reveal that perceptions about technology's influence on decision-making and the clarity of citizens' preferences matter more than public perception and input. Perhaps these particular perceptions emerge as important because municipal government's primary objective is service delivery, and these outcomes directly influence or enhance that objective. Thus, this study underscores the importance of manager's perceptions while simultaneously demonstrating the influence of differences in classifications of perceptions.

In another example, this research also underscores the significance of institutions in relation to adoption behavior (Fountain, 2001; Gil-Garcia, 2012). Again, not all institutions are equally influential. The findings reveal that institutional pressures linked to resources such as funding and knowledge and expertise have a greater influence on e-participation adoption. These pressures may be more important since e-participation ICTs often require greater resources to implement successfully.

Contrary to much of the e-government literature, none of the environmental variables are important predictors of adoption. For example, population is almost always a significant predictor of innovation in organizations, where larger jurisdictions are more likely to adopt new technologies due to greater resources. Our research findings support what is evident in practice, that even small municipalities are using e-participation ICTs in innovative ways. In addition, perhaps the innovation type matters. Population diversity may make participation more difficult in larger cities compared to smaller ones. Therefore, e-participation adoption is less likely in larger cities, or they may happen on a much smaller scale. For example, in the city of Chicago, Illinois, PB Chicago (PBC) is an initiative that enables citizen participation in budget decision making. The participatory budgeting process enables community residents to determine the

allocation discretionary capital funds controlled by Aldermen. Ward residents and stakeholders voice their preferences, propose ideas, help develop proposals, and vote on projects. Ultimately, projects with the most votes are submitted to the Alderman and then the City for implementation. The initiative encourages the use of technology to enable citizen participation in budgeting decisions and spending at the neighborhood level (PB Chicago, 2015).

The findings reveal that the categories of factors do not uniformly influence e-participation adoption. While the model presented in this research does not fully explain adoption behavior, the findings contribute relevant knowledge in an area of research that is dynamic.

7.2 Contributions and Implications

This dissertation makes some important contributions to the development of public administration theory and practice. First, this section discusses the theoretical and empirical contributions of this study. Then, this section discusses the implications for policy and practices.

7.2.1 Theoretical and Empirical Contributions

This research makes some important contributions to public administration literature. First, it builds on extant theory. The model presented here predicts direct influences between the predictor variables and e-participation adoption, then, tests the theory in a municipal setting. As a result, we can understand the unique context in which municipalities are situated, and the influence of those contextual factors on adoption behavior. In order to explain e-participation adoption in U.S. municipalities, I apply three theories including the *evolutionary approach*, the *technology enactment framework*, and *institutional theory*.

The results provide some support for the application of the evolutionary approach, often represented in the stage model developed by Layne and Lee (2004). This approach depicts a linear perspective of e-government development, suggesting that it moves along a linear path, in a precise order until full maturity is achieved. Some scholars criticize this approach because of its lack of predictive capability (Coursey & Norris, 2008), oversimplification of e-government development (Yildiz, 2007), and lack of attention to contextual dynamics (Gil-Garcia, 2012). However, the findings of this study suggest that although e-government development may not be a linear process, e-communication and e-services adoption may provide experience, skills, and comfort required for the implementation of e-participation ICTs. In this research, the adoption of e-communication and e-services, less risky ICTs, are positively related to e-participation adoption, more complex ICTs. While adoption does not occur in a vacuum, previous adoption builds organizational capacity that may influence later adoption.

The application and extension of the technology enactment framework represents an important theoretical contribution. TEF posits that e-participation adoption depends on a match between the technology and implementing organization and its employees as well as the organizational and institutional contexts. I applied a modified version of this model that adds predictions about the direct influence of environmental factors on adoption behavior. I further modify this framework, extending the application of institutional theory by modeling the influences of coercive, normative, and mimetic pressures. As a result, this research considers the influence of different types of institutional pressures on adoption behavior. This research also makes the distinction between the uses or implementation of ICTs, and makes the key assumption that the same ICT may be implemented or used for different purposes. This distinction suggests that

The results moderately support the application of these frameworks. Organizational factors that include structural and management processes, strategies, and attitudes influence e-participation adoption, although they differ in their effects. For example, I find that organizational structure and management processes and strategies are not significant, while management attitudes or perceptions are significant. This implies that public managers make strategic decisions about technology adoption by evaluating the fit of the technology with the organization.

Moreover, the model of adoption presented in this research extends extant theory by including the managers' perceptions of the outcomes associated with technology use. Prior e-government and e-participation studies have not captured managers' perceptions in this way, in order to understand their influence on adoption behavior. The frameworks advanced by Fountain and Gil-Garcia have also neglected to investigate the influence of managers' perceptions of the technology on the adoption and development of e-government initiatives.

Surprisingly, no environmental factors are significant, although this result Gil-Garcia's (2012) findings. Gil-Garcia's (2012) framework explores the success of e-government and influences the theoretical framework presented in this study. Gil-Garcia (2012) finds that demographic factors such as education and income do not directly influence e-government development. I initially expected that because local governments, compared to state governments, are closer to their constituents, environmental factors would be statistically significant predictors of e-participation adoption. However, I find no support for this argument.

A possible explanation for this finding is that I assume that environmental or socio-economic factors drive participation because they can serve as a proxy for demand from citizens,

but model e-participation adoption from the supply side rather than the demand side. In addition, environmental factors may influence the adoption of e-participation ICTs by citizens rather than municipalities. The adoption of e-participation may be the result of political, social, or economic events that create the need or demand for citizen participation. Natural disasters, controversial policies, and political or administrative misconduct, can create the demand for greater transparency, accountability, and information from government. This can lead to the need for greater involvement in decision-making processes from citizens. As a result, governments may adopt tools, including e-participation ICTs to accommodate increased participation. In these circumstances, adoption by government is not influenced by environmental factors but by the need for greater citizen participation triggered by current events or political contexts. These alternative explanations for e-participation adoption are not captured in this research but can help explain the lack of influence of environmental factors on e-participation in the model I present in this dissertation.

The theory's integration of institutionalism is also moderately supported. Generally, coercive and normative pressures have greater influence on e-participation adoption than mimetic pressures. This demonstrates that municipalities are subject to different kinds of institutional pressures and these pressures result in different organizational outcomes. Moreover, I find that, based on the data analyzed in this study, organizational and institutional factors have the greatest influence on adoption behavior.

This study also makes some important empirical contributions to the e-government literature. First, this study extends the work of previous scholars (Ahn, 2011; Li & Feeney, 2012; Wang & Feeney, 2014) this research makes the important distinction between the types of technology and their utility, then investigates the empirical relationship between those ICTs.

Although the underlying ICTs for e-communication and e-participation may be the same, they are enacted or implemented for different purposes. Moreover, ICTs enacted for service provision differ from those enacted for information dissemination or participation. This study disentangles e-government technologies in order to understand the paths to adoption.

Not only does the adoption model underscore the importance and influence of managers' perceptions of adoption behavior, it also identifies different classifications of perceptions about technology-related outcomes and their relative influence on e-participation adoption in municipalities. The factor analysis reveals that 15 questionnaire items load onto four factors that independently influence e-participation adoption in different ways. This is a unique contribution to the literature and offers new insight on the relevance of different kinds of perceptions and their influence on e-participation adoption.

Finally, the research design provides a comprehensive examination of ICT adoption, incorporating web content data as well as public manager survey responses into the analysis. The study extends the work of previous researchers (Jimenez et al., 2012; West, 2005; Musso et al., 2000; Mossberger et al., 2013) by conducting a website analysis on a random sample of U.S. cities of various sizes rather than restricting the sample based on city size, location, or previous IT expertise. This enables the results to be generalizable.

7.2.2 Practical and Policy Implications

This research has some significant implications for local government practitioners. The study finds that website design and content is an important predictor of adoption behavior. This

finding highlights the importance of web design and more importantly, the need for citizen-centered approach to e-government.

As urban areas grow more populated, existing government services and processes may become strained. This can lead to critical problems, forcing cities to find smarter solutions (Chourabi et al., 2012, p.2289). These *smart cities* encompass interconnectedness between citizens, technologies, and government and are increasingly become the focus of e-government research and national policies. In September 2015, President Obama launched the Smart Cities Initiative, investing approximately $160 million to help communities build the infrastructure to address their unique problems (United States Office of the Press Secretary, 2015). Similarly, the National Science Foundation (NSF) has an organizational focus on smart and connected communities, and integrates research with practice to resolve key challenges at the local level of government. These federal initiatives promote and support smart community development and seek to understand mechanisms and processes involved in smart city development.

E-government, particularly e-participation, are important components of successful smart city development (Nam & Pardo, 2011). One aspect of smart cities includes the emphasis on data and information sharing among and between citizens and government using technology in order to address public problems like fighting crime, economic development, traffic congestion, and service delivery. Recent research finds that adoption of transformative technologies is slow, so smart city development may also be slow. Perhaps the path to adoption is hindered by a lack of infrastructure required to support the new technologies (Hanna, 2010), including a lack of understanding about the components of the necessary infrastructure. Attention to the predictors of e-participation adoption can help practitioners understand the infrastructure necessary to achieve smart communities. This research adds to the knowledge about the necessary

infrastructure for developing a smart community. Since collaborative governance rooted in participation is the cornerstone of smart cities (Nam & Pardo, 2011), understanding the predictors of e-participation implementation can help move municipalities toward becoming a smart city.

Similarly, for those municipalities that are new to the Web or for governments seeking more inclusive and participation-oriented government, this research can be used to understand a path to engagement online. The path will likely require a citizen-centered approach to governing, as evident in the findings of this study. Policies requiring governments to have a web presence, and the ensuing security and privacy policies, and administrative processes can reflect the citizen-centric characteristics of municipal technology infrastructures.

7.3 Limitations and Future Research

7.3.1 Limitations

This research has some limitations. First, this study uses cross-sectional data to understand the predictors of the adoption of e-government ICTs. This design limits the ability to generalize about adoption behavior and does not allow us to make causal inference. Both technology and e-participation research are dynamic (Medaglia, 2012), and this cross-sectional research design limits our ability to capture that dynamism and fully understand e-participation and e-government development in the U.S.

The methods used to analyze the data also pose a limitation. This study investigates direct relationships between predictors and e-participation adoption. It fails to capture potential variance in influences from variables across levels of data. For example, individuals are nested within departments, which are then nested within cities, creating clusters of observation. As a

result, the data could potentially violate the assumption of independence. Similarly, this model presented in this study fails to account for potential interactions among predictor variables.

This research draws extensively from self-reported survey responses, thereby introducing the potential measurement error. For example, public managers responding to the survey may provide inaccurate answers to some questions due to an inability to recall and lack of knowledge or expertise in e-government processes within their department (Golden, 1992; Tourangeau, Rips, & Rasinski, 2000).

Errors in conceptualization and measurement present additional limitations of this research. Due to the unavailability of data on the digital divide, the measures used in this research represent proxies for the divide, thereby introducing construct validity (Babbie, 2010). Also, several constructs and variables are omitted from the model due to limitations in the availability of data. For example, political climate variable is omitted because there is limited data about political culture and voting behavior at the municipal level. While these measures exist in abundance at the county and state levels, data at these levels reflect responses over larger geographic areas and may not adequately reflect political microcosms within cities and municipalities. Similarly, due to limits on the data availability, this study does not include a measure for fiscal capacity, a potentially and likely important predictor of e-government development.

A strength of the approach employed in this research is the attention paid to common source bias. Common source bias, a source of measurement error, occurs when the variance between variables is due to the data collected from the same source, rather than from a genuine relationship between the variables (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). This

research obtains measures of the outcome and predictor from different sources, which include city websites, the U.S. Census Bureau, and the National E-Government Survey. This procedure is optimal at remedying common source bias because the data collected is not biased by the source or the rater (Podsakoff et al., 2003, p. 887).

7.3.2 Future Research

This dissertation provides a framework for analyzing technology adoption and the development of e-participation in municipalities. This study suggests many important areas for future research.

In this research, I use a random sample of U.S. municipalities to explore adoption behavior. While this research design yields generalizable results, it does not provide a complete explanation for adoption behavior. Specifically, it does not reveal *why* organizational and institutional factors are important predictors of e-participation, nor does it reveal *how* these factors influence adoption. Therefore, future research can benefit from replicating this case and the addition of case study analysis using a design similar to Gil-Garcia (2012). The case study should include interviews with department managers, including IT managers, as well as in-depth analysis of e-participation activities, initiatives, strategies, and tools used in order to understand the processes of e-participation adoption. Moreover, future research can use case analysis to extend the research further by mapping organizational and institutional factors to outcomes, in terms of organizational capacity, structure, and policies.

Website evaluation should be a critical part of future research as they are the face of government to citizens and can influence citizens' response to e-government (Hanna, 2010). Each year, the Center for Digital Government awards government websites for efforts in using

technology to better serve their constituents (Center for Digital Government, 2015). These awards set benchmarks and best practices for government website design in the United States. Future investigations of municipal websites should incorporate the standards outlined by the Center for Digital Government in their analyses. Replicating this study with more robust, commonly used measures of website accessibility and usability will improve our understanding of municipal website development and design. For example, Youngblood and Mackiewicz (2012) use two tools, WebAIM's accessibility evaluation tool and the World Wide Web Consortium's online HTML Validation Service, to evaluate municipal websites in Alabama. These tools can be used to evaluate the websites of select cases or the entire sample used in this study to compare government website development and evaluate differences in user's experiences with government online.

Building on the results discussed in this dissertation, future studies should employ methods and analyses to capture the development of technology use in government over time. A longitudinal design can help elucidate e-government development as over time. A longitudinal design can also identify the influence of technology adoption on organizational and institutional change. For example, the results indicate that organizational factors are important predictors of e-participation adoption. Specifically, I find that aspects of technical capacity (e-communication and e-services adoption) and managers' perceptions of technology outcomes are strong predictors of adoption behavior. This study illustrates different classifications of perceptions, and the variance of those differences on e-participation. Future research is needed to reveal any changes in perceptions over time and the subsequent influence on e-participation adoption. In addition, the model of e-participation adoption I present predicts direct relationships between organizational factors and the dependent variable. However, future research should build on the

findings and model interactions between the three categories of independent variables, as well as individual factors within the categories. We may find that over time, the interaction between technical capacity and manager perceptions may have a different influence on adoption behaviors.

In this study, e-services, e-communication, and website content and design can be viewed as proxies for human and technical capacity. I make the argument that these technologies build comfort and experience with technology as well as the technical capacity needed for the adoption of e-participation ICTs. However, we have no knowledge of the accumulation of human and technical capacity without an examination of adoption behavior over time. To that end, an alternative explanation for the significant influence of e-services, e-communication, and website content and design on adoption behavior is justified. The influence of these factors may be the result of municipalities' positive or negative orientation towards innovation (Moon & Norris, 2005).

Moon and Norris (2005) posit that local governments vary in their approach to the adoption of new technologies because of differences in risk tolerance and experiences with them. Similarly, Oliveira and Welch (2013) use the term *innovativeness* to describe "the level of perceived encouragement of innovative activity in the organization" (p. 4). As a result, some municipalities may adopt ICTs because they have a more favorable view of innovation as a whole, while others may not adopt ICTs because of lower risk tolerance or negative past experiences with innovation. Rather than supporting the evolutionary approach to e-government development, the findings here may support the perspective that managerial innovation orientation, or the perceived risks and experiences with technology, matters for adoption. Therefore, the adoption of e-services, e-participation, and user-centered website content and

design may represent or reflect their perceived risks and experiences association with innovation in general (Moon & Norris, 2005, p. 47). Future research should attempt to measure organizational innovation orientation or innovativeness by capturing managers perceived risks and experiences with technology, in order to determine its influence on adoption behavior.

Citizen participation can result in the collection of new and increased data. This additional data may bring new challenges to municipalities that grapple with the collection, storage, and management of the information. Future research should explore how participation influences IT infrastructure and management, including technologies, policies, and processes. Moreover, as U.S. society increasingly moves towards the use of mobile technologies, future studies should investigate governmental response to this shift and the resulting influences on participation strategies, processes, tools, and evaluation. A possible research design may include the collection of qualitative data including interviews and content analysis of municipal websites and strategic plans. From this data, one may explore the relationship between

Finally, this research signals the integration or joining up of government services. Contrary to expectations, I find no evidence to support statistically significant differences in adoption across departments. This suggests that technology may be boundary spanning with objectives, infrastructure, policies, and process that cross departmental boundaries (Hanna, 2010). In the aim to become, municipalities may develop enterprise-wide architectures that provide the capacity for collaboration and information sharing across departments, and reduce data silos. Future research should evaluate the extent to which technology use and implementation reflects this paradigm shift.

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APPENDIX A

UNIVERSITY OF ILLINOIS
AT CHICAGO

Office for the Protection of Research Subjects (OPRS)
Office of the Vice Chancellor for Research (MC 672)
203 Administrative Office Building
1737 West Polk Street
Chicago, Illinois 60612-7227

Human Subject Research Determination Notice

July 1, 2016

Adrian Brown, BA, MPA
Public Administration
412 S Peoria, Room 311
M/C 278
Chicago, IL 60607
Phone: (312) 355-2672 / Fax: (312) 996-8804

RE: Research Protocol # 2016-0694
        "E-Government in U.S. Cities: Enabling Engagement or Reinforcing Tradition"

Sponsor(s): None

Dear Ms. Brown:

> The UIC Office for the Protection of Research Subjects received your "Determination of Whether an Activity Represents Human Subjects Research" application, and has determined that this activity **DOES <u>NOT</u> meet the definition of human subject research** as defined by 45 CFR 46.102(f)/ 21 CFR 50.3(g) and 21 CFR 56.102(e)/ 38 CFR 16.102(f).
>
> You may conduct your activity without further submission to the IRB.
>
> If this activity is used in conjunction with any other research involving human subjects or if it is modified in any way, it must be re-reviewed by OPRS staff.

cc: Jered Carr, Public Administration, M/C 278
        Kelly LeRoux (faculty sponsor), Public Administration, M/C 278

Table 15: Variable Definitions and Measurements

Category	Variable	Description	Measurement	Survey Questionnaire Item
Dependent Variable	E-Participation	Sum of ICTs used to promote participation online	Count values 1-26	"For what purposes does your organization use the types of tools that you named? ...To enable or facilitate participation by citizens or external stakeholders"
Organizational	E-Communication	Sum of ICTs used to disseminate information externally	Count values 1-26	"For what purposes does your organization use the types of tools that you named?... To disseminate information externally."
	E-Services	Sum of ICTs that enable service delivery online	Count values 1-4	"Please indicate if your department currently offers the following online services or not." Online payment for services including fees and fines , Online delivery of local government records or department information to citizens who request information, Online requests for services that your department is responsible for delivering, Online completion and submission of job application
	Web Accessibility and Usability	Six website features that capture website accessibility and usability include: Privacy statement, Search bar, Law index, Page date, Site index, Non-English	.00 = "No"; 1.00 = "Yes"	Content analysis of municipal websites.
	Data_Security	Our org has adopted clear data security policies to ensure citizen privacy	**1.00 = "Strongly disagree"; 2.00 = "Disagree"; 3.00 = "Neither agree nor disagree"; 4.00 = "Agree"; 5.00 = "Strongly agree"**	"Please indicate the extent to which you agree or disagree with the following statements: Our organization has adopted clear data security policies to ensure citizen privacy."

APPENDIX B (continued)

Category	Variable	Description	Measurement	Survey Questionnaire Item
Organizational	IT_Management	Internal person or department responsible for maintaining and improving dept website and e-government services	.00 = "No"; 1.00 = "Yes"	"Who is responsible for maintaining and improving your department website and e-government services?" A designated person in our department, A separate information technology department, Contracted external service providers only.
	Participation_Input	Mean of items about perceptions of the outcomes of ICTs	1.00 = "Very Small Extent"; 2.00 = "Small Extent"; 3.00 = "Somewhat"; 4.00 = "Great Extent"; 5.00 = "Very Great Extent"	"In your opinion, to what extent do electronic information and communication technologies lead to the following outcomes?" Improve governmental decision-making, Lead to better policies, Revitalize public debate, Improve information dissemination to external stakeholders and citizens, Reduced clarity about what citizens want, Increase opportunity to interact and collaborate with other government officials, Increase access to government services, Enable feedback on service quality, Increase certainty about the importance of the work I do, Enhance citizen trust of government, Improve efficiency and lower costs of the department"

APPENDIX B (continued)

Category	Variable	Description	Measurement	Survey Questionnaire Item
Organizational	Reduced Democratic Governance	Mean of items about perceptions of the outcomes of ICTs	1.00 = "Very Small Extent"; 2.00 = "Small Extent"; 3.00 = "Somewhat"; 4.00 = "Great Extent"; 5.00 = "Very Great Extent"	"In your opinion, to what extent do electronic information and communication technologies lead to the following outcomes?" Improve governmental decision-making, Lead to better policies, Revitalize public debate, Improve information dissemination to external stakeholders and citizens, Reduced clarity about what citizens want, Increase opportunity to interact and collaborate with other government officials, Increase access to government services, Enable feedback on service quality, Increase certainty about the importance of the work I do, Enhance citizen trust of government, Improve efficiency and lower costs of the department"
	Decision Making	Mean of items about perceptions of the outcomes of ICTs	1.00 = "Very Small Extent"; 2.00 = "Small Extent"; 3.00 = "Somewhat"; 4.00 = "Great Extent"; 5.00 = "Very Great Extent"	"In your opinion, to what extent do electronic information and communication technologies lead to the following outcomes?" Improve governmental decision-making, Lead to better policies, Revitalize public debate, Improve information dissemination to external stakeholders and citizens, Reduced clarity about what citizens want, Increase opportunity to interact and collaborate with other government officials, Increase access to government services, Enable feedback on service quality, Increase certainty about the importance of the work I do, Enhance citizen trust of government, Improve efficiency and lower costs of the department"

APPENDIX B (continued)

Category	Variable	Description	Measurement	Survey Questionnaire Item
Organizational	Efficacy	Mean of items about perceptions of the outcomes of ICTs	1.00 = "Very Small Extent"; 2.00 = "Small Extent"; 3.00 = "Somewhat"; 4.00 = "Great Extent"; 5.00 = "Very Great Extent"	"In your opinion, to what extent do electronic information and communication technologies lead to the following outcomes?" Improve governmental decision-making, Lead to better policies, Revitalize public debate, Improve information dissemination to external stakeholders and citizens, Reduced clarity about what citizens want, Increase opportunity to interact and collaborate with other government officials, Increase access to government services, Enable feedback on service quality, Increase certainty about the importance of the work I do, Enhance citizen trust of government, Improve efficiency and lower costs of the department"
	Department	Mayors Office; Community Development; Finance; Parks and Recreation; Police	Dummy Variables .00 = "No"; 1.00 = "Yes"	Respondents' Department
	Centralization	Sum of scaled items about decision-making.	1.00 = "Strongly disagree"; 2.00 = "Disagree"; 3.00 = "Neither agree nor disagree"; 4.00 = "Agree"; 5.00 = "Strongly agree"	"Please indicate your level of agreement or disagreement with each of the following statements: There can be little action taken here until a supervisor approves a decision; In general, a person who wants to make his own decisions would be quickly discouraged in this agency; Even small matters have to be referred to someone higher up for a final answer."
	Formalization	Sum of scaled items about formal rules.	1.00 = "Strongly disagree"; 2.00 = "Disagree"; 3.00 = "Neither agree nor disagree"; 4.00 = "Agree"; 5.00 = "Strongly agree"	"Please indicate your level of agreement or disagreement with each of the following statements: Our organization has clear policies about public provision of docs and data that all employees must follow; Our organization has recommended guidelines or best practices for public provision of documents and data."

APPENDIX B (continued)

Category	Variable	Description	Measurement	Survey Questionnaire Item
Institutional				
Coercive	Legal	Legal requirement for participation	.00 = "No"; 1.00 = "Yes"	"Is your organization legally required to include citizen input in policy-making activities?"
Coercive	Government Influence	Mean of level of influence exerted by the governor, state legislature, state courts, and federal governments	1.00 = "No Influence"; 2.00 = ; 3.00 = "Moderate Influence"; 4.00 = "Strong Influence"; 5.00 = "Very Strong Influence"	Please indicate the level of influence the following institutions or individuals exert over your organization. Mayor, Mayor's Council, Other city departments, Governor, State legislature, State courts, Business groups, Advocacy groups, Public opinion, Media, Federal government
Normative	Non-Government Influence	Mean of level of influence exerted by business groups, advocacy groups, public opinion, and the media	1.00 = "No Influence"; 2.00 = ; 3.00 = "Moderate Influence"; 4.00 = "Strong Influence"; 5.00 = "Very Strong Influence"	Please indicate the level of influence the following institutions or individuals exert over your organization. Mayor, Mayor's Council, Other city departments, Governor, State legislature, State courts, Business groups, Advocacy groups, Public opinion, Media, Federal government
Normative	Professional Association Membership	Belong to a professional association	.00 = "No"; 1.00 = "Yes"	Do you belong to a professional association?
Normative	Council-Manager	City Manager or Mayor-Council form of government	0= No, City Manager; 1= Yes, Mayor-Council	
Mimetic	Regional Adoption	Average number of e-participation ICTs adopted by municipalities within the same region	Count Values 2.70-4.80	
Environmental				
	Percent_White	Percent of population White		
	Education	Percentage of Population with Bachelor's Degree		
	Log_Income	Log Income		
	Log_Population	Log Population		

APPENDIX C

Table 16: Correlation Matrix

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1 E-Participation	1.000																															
Organizational Variables																																
2 E-Communication	.437**	1.000																														
3 E-Services	.231**	.293**	1.000																													
4 Privacy Statement	.123**	.151**	.169**	1.000																												
5 Search Bar	.054	.127**	.089**	.246**	1.000																											
6 Law Index	.068*	.016	.034	.079*	-.032	1.000																										
7 Page Date	.020	.007	.008	-.019	-.043	.013	1.000																									
8 Site Index	.014	.009	-.059	-.026	.110**	-.018	-.092**	1.000																								
9 Non English	.072*	.087**	.076*	.072*	.146**	-.028	-.050	.015	1.000																							
10 Data Security	.068*	.073*	.128**	.042	.044	.012	.013	-.036	-.060	1.000																						
11 IT Management	.051	.063*	.075*	.026	.050	-.024	-.028	-.002	.038	.061	1.000																					
12 Decision_Making	.189**	.159**	.140**	.020	.022	.012	.032	-.032	.034	.104**	.036	1.000																				
13 Participation_Input	.206**	.194**	.159**	.048	.076*	.025	.002	-.003	.059	.124**	.044	.446**	1.000																			
14 Efficacy	.128**	.086**	.117**	-.003	-.012	-.003	-.022	.034	.057	.069*	.041	.378**	.416**	1.000																		
15 Reduced Democratic_Governance	-.040	.052	.014	.014	.040	.042	-.014	.002	.030	-.034	-.001	-.091**	-.061*	-.137**	1.000																	
16 Mayors Office	.088**	.148**	.135**	.071*	-.016	.016	.015	-.011	.035	.021	-.033	.092**	.102**	.100**	-.013	1.000																
17 Community Development Department	-.028	-.050	-.146**	-.054	.032	.038	-.014	-.076*	-.011	-.116**	-.015	-.050	-.009	-.115**	.016	-.242**	1.000															
18 Finance Department	-.055	-.036	.056	.004	-.017	-.062	.042	-.033	-.036	-.103**	-.075*	-.008	-.075*	-.016	-.092**	-.195**	-.229**	1.000														
19 Parks & Recreation	.075*	.088**	.053	-.003	-.005	-.013	-.010	.073*	.026	-.084*	.036	-.040	.024	.056	.042	-.236**	-.277**	-.224**	1.000													
20 Police Department	-.078*	-.139**	-.072*	-.010	.003	.014	-.025	.042	-.014	.261**	.074*	.014	-.041	-.014	.033	-.254**	-.299**	-.241**	-.292**	1.000												
21 Centralization	-.101**	-.110**	-.143**	-.051	.020	.001	.113**	-.045	-.001	-.175**	-.035	-.119**	-.101**	-.045	.035	.008	.076*	.107**	-.036	-.135**	1.000											
22 Formalization	.076**	.077**	.105**	.066	-.008	-.015	-.029	-.013	.030	.393**	.102**	.115**	.148**	.097**	-.007	-.055	-.071*	-.084*	-.028	.215**	-.112**	1.000										
Instrumental Variables																																
23 Legal	.112**	.095**	.062	.029	.052	.060	.018	-.054	.001	-.102**	.027	.015	.042	.003	-.018	.135**	.349**	.035	.018	-.502**	.040	-.104**	1.000									
24 GovInfluence	-.001	.034	.049	.025	-.001	.009	-.011	-.039	.016	.080**	.008	.127**	.107**	.091**	-.054*	.110**	-.022	.026	-.149**	.047	.013	.064*	.068*	1.000								
25 Non-GovInfluence	.106**	.154**	.119**	.118**	.082*	.011	.008	-.062	.012	.055	.008	.169**	.152**	.133**	.060*	.083**	.039	-.096**	.059	-.089**	-.014	.057	.118**	.334**	1.000							
26 Professional Association	.060	.026	.098**	-.015	.112**	-.007	.007	-.015	-.010	.026	.032	.018	.024	-.035	.055	-.115**	-.041	.049	.081*	.024	-.033	.006	-.034	-.046	.013	1.000						
27 Council-manager	-.026	.081**	.129**	.204**	.273**	.018	.005	.002	.145**	.107**	-.014	-.019	.048	-.034	.079*	.056	-.074*	.019	-.009	.016	-.045	.056	-.004	-.045	.033	.148**	1.000					
28 Regional Adoption	.088**	.167**	.190**	.168**	.124**	.036	.042	-.057	.048	.052	-.014	.046	.074*	-.010	.078**	-.010	-.021	.025	.016	-.007	-.054	.058*	.006	.008	.088**	.098**	.290**	1.000				
Environmental Variables																																
29 % White	.029	.008	.049	-.027	.037	-.013	.026	-.061*	-.133**	.016	.054	-.020	.001	-.039	.052*	.008	.028	.018	-.022	-.028	-.013	-.031	.052	-.095**	-.021	.033	-.040	.031	1.000			
30 % with Bachelors Degree	.088**	.139**	.157**	.159**	.152**	.012	-.088**	-.010	-.064*	.073*	.015	.074**	.081**	.003	.022	-.008	.016	.010	.000	-.017	-.045	.064*	.055	-.055*	.042	.081*	.107**	.060*	.131**	1.000		
31 Log Income	.037	.080**	.144**	.130**	.151**	-.049	-.086**	-.026	-.050	.057	.025	.039	.078**	-.019	.020	-.003	-.012	.036	-.003	-.012	-.062*	.044	.036	-.068*	.009	.088**	.172**	-.003	.161**	.641**	1.000	
32 Log Population	.067**	.127**	.138**	.230**	.119**	.073**	-.024	-.181**	.193**	.055	.020	.046	.055*	.067*	-.020	-.003	.027	-.011	-.026	.011	-.033	.032	.042	.090**	.114**	-.058	.032	.143**	-.202**	-.004	-.037	1.000

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

<u>**VITA**</u>

Adrian G. Brown

EDUCATION

      University of Illinois at Chicago, Chicago, IL
      Doctor of Philosophy in Public Administration, 2016

      Troy University, Atlanta, GA
      Master of Public Administration, 2009

      University of North Carolina at Chapel Hill, Chapel Hill, NC
      Bachelor of Arts in Communication Studies, 2000

Research Interests: Digital government, digital inclusion, and civic engagement

PROFESSIONAL EXPERIENCE

Research Assistant, Center for Digital Inclusion, Graduate School of Library and Information Science, University of Illinois at Urbana-Champaign, June 2015 – June 2016

Teaching Assistant, Global Education and Training, China Executive Leadership Program, University of Illinois at Urbana-Champaign, Summer 2015 and Summer 2016

Graduate Research Assistant to the Department Head, Department of Public Administration, University of Illinois at Chicago, May 2011 – May 2015

Research Analyst
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COURSES TAUGHT

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Urban Government I: Managing the Internal Environment (UPA 303), Fall 2013 and Fall 2014 (Undergraduate)
Department of Public Administration, University of Illinois at Chicago

PAPERS

Mossberger, K., J. Benoit-Bryan and A. Brown (2014). Smart Communities Formative Evaluation: Civic 2.0 Participant Survey and Interviews with Partner Organizations. Center for Policy Informatics, Arizona State University.

"Building Digital Communities – Pilot Formative Evaluation"
Evaluation research conducted through the Online Computer Library Center, Inc. (OCLC); the Building Digital Communities Pilot program funded by the Institute of Museums and Library Services (IMLS), 2013

WORKS IN PROGRESS

Feeney, Mary K. and **Brown, Adrian G**. "Are small cities online? Content, variation, and ranking of U.S. municipal websites".

Brown, Adrian G, Davis, G. Leah, and Mantode, Kamna "Implementing BTOP in U.S. libraries".

Brown, Adrian G. and Benoit-Bryan, Jennifer M. "Youth, Internet access, and civic engagement".

PRESENTATIONS

"E-Government in U.S. Cities: Enabling Engagement or Reinforcing Tradition"
Poster presented at the Conference on Science and Innovation Policy,
Georgia Institute of Technology, Atlanta, GA, 2015

"E-Government in U.S. Cities: Enabling Engagement or Reinforcing Tradition"
Presentation presented at the Doctoral Colloquium for the Digital Government Society 2015 Annual Conference, Arizona State University, Phoenix, AZ, 2015

"Smart Communities Formative Evaluation"
Evaluation research presented at eChicago 2013 Conference, Chicago, IL 2013

"Smartphones and Minorities: Closing the Gap or Creating New Disparities"
Paper presented at the Annual Midwest Political Science Association Conference, Chicago, IL, 2012

PROFESSIONAL SERVICE and AFFILIATIONS

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