Developing Citizen-Centric E-Government Service:
A Case of Bilingual Web Services by California Cities and Counties

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ABSTRACT

Despite of the rapid growth of Hispanic population, local governments could not develop quality e-services to meet the increased demands of their non-English speaking constituencies. This research examines the supply and demand of bi-lingual e-services using a sample of California cities and counties. Results indicate that, at the county level, demand of the community and professional management encourage the adoption of bi-lingual e-services, yet outsourcing negatively affect the quality of such services; at the city level, demand is a relatively weak driver to bi-lingual services, cities' development of bi-lingual services is more constrained by their economic and technological capacities. Practical lessons for public practitioners to improve e-service delivery are discussed.

INTRODUCTION

E-government is the application of Information Communication Technologies (ICTs) by government agencies to deliver information and services for the benefit of citizens, businesses, and public servants. E-government services are designed to serve constituents' needs via convenient access to public information and services at any time, any place, or any form.

Technological advancements have propelled web service development all over the world. E-government service development, as valued by the United Nations e-government Survey in 2013, focuses on e-government as a crucial tool to promote economic growth, government reinvention, prosperous industries, and increased productivity. Current research discussions focus on barriers to extend services and access, including individual privacy protection, information security, and government records management (Alshehri & Drew, 2010; Nkwe, 2012).

Despite any experienced variances within e-government development, there has been a consistent emphasis on the citizen centric approach, which argues that e-government service development should accommodate public perspectives. Aldrich, Bertot, McClure (2002) maintain that the development of e-government shows a tendency toward the citizen-centered strategy. In such a strategy, initiatives focus on the problem of incorporating citizen needs to develop integrated, rather than stovepipe systems, and to create single-window, rather than multiple-window, service providers. Further, e-governments take the initiative in promoting information sharing, instead of acting as isolated entities. As those initiatives are implemented, deployment of information technology and internet services facilitates the democratic process, thereby allowing citizens to participate in the rule-making process or provide comments for future development in electronic issues. In addition, the perception of usefulness and ease of use

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become crucial to achieving the needs of the citizens and to adopting government e-services (Warkentin et al., 2012; Horst, Kuttschreuter & Gutteling, 2007). For example, the education and inclusion of individuals with disabilities are special concerns, as noted by Jaeger and Thompson (2003). Many studies currently reveal concerns about e-government development at the local level (Al-Khouri, 2011; Norris and Reddick, 2013). Local government has achieved incremental growth toward this end, but this has not been recognized as sufficient.

Jaeger (2003) considers the importance of offering citizen-oriented services to be a crucial objective of e-government. E-government plays a metaphoric role as an endless wire, which refers to its thread services delivery through citizens, business, and governments at all levels. Further, a secondary goal of e-government is to achieve greater citizen participation in the democratic process. Luarn and Lin (2003) assert that users' attitude is the successful key to deliver electronic services. Jaeger and Thompson (2004) reinforces that the usage of e-government information should be applicable to the users' practical needs. As a result, citizens have confidence in the quality of services, government competence, and the precision and safety of transactions. Citizens find themselves ready and able to easily accept e-services, if delivery of those services is compatible and beneficial to them. Providing citizen-centered services leads to a win-win strategy. On one hand, it creates a willingness among potential users, resulting in effective adoption of e-service. On the other hand, citizens benefit by enjoying the convenience of saving money and time by accessing an online payment system. Citizen participation and ICT are two important elements of e-democracy, which gives citizens multiple opportunities to participate in the process of rule-making by utilizing information communication technology. Also, e-democracy can be considered a modern approach for improving the democratic process of enhanced citizen involvement (Mahrer and Krimmer, 2005). E-voting, for instance, should

develop detailed procedures, purposes, methods on the basis of the citizen centric approach. Rabaiah and Vandijck (2009) emphasize the importance of a customized strategy to offer online services. This strategy ensures that resource allocation and government investments to serve the public to a greater extent are best appropriated.

One important determinant in the quality of a webpage is the bilingual service provision. According to Segovia and Jennex (2006), language-translation services for bilingual populations increase citizens' confidence in e-government performance. The composition of the population itself creates a demand for bilingual services. Multilingual websites have become more and more necessary because of a growing number of races existing in some countries, such as India, Switzerland, China, Russia, Spain, and the U.K. The case of the US also demonstrates a growing need for bilingual services, especially when addressing the issue of 'digital divide'. Bilingual services are beneficial when addressing and bridging the digital divide among diverse populations (Graham, 2002). Unfortunately, despite the importance of bilingual service, the study of the bilingual service provision on government websites is very limited.

This research attempts to examine the supply and demand factors of bilingual e-service provision and provide practical lessons for public practitioners to improve e-service delivery. The article first introduces the development of e-government and illustrates how the popularity of advanced technology advances services delivery. With an emphasis on citizen-oriented services, based on a balanced analysis of the supply and demand factors for e-services, we deprive the hypothesis that currently e-service provision is more likely driven by supply than demand. To examine the hypothesis, this research uses California as an example and conducts web evaluations as well as statistical analysis in logistic regression and the ordinary least square

(OLS). The research results, along with lessons and recommendations are presented in the hope to provide guidelines for public practitioners.

CITIZEN-CENTRIC E-GOVERNMENT

There is not a universally accepted definition of the concept of the e-government (Halchin, 2004). In Halchin's (2004) article, for instance, e-government is defined as a way of doing "more with less," transferring power to citizens, and ensuring better delivery of public services to citizens through the use of ICTs. Another definition can be found in Reddick's (2005) article. The author views e-government as a way of integrating interactions between government and citizens, companies, customers, and public institutions through the application of modern information and communication technologies. E-government in industrialized countries tends to pay attention to transforming of government service delivery for better access (e.g., Hwang, Choi & Myeong 1999), while e-government in developing countries emphasizes means and processes to establish a platform to distribute government information (e.g,, Bensghir and Yildiz 2002). No matter which, all the definitions intend to put citizen in the center place and view e-government as a tool to empower citizens. In this paper, e-government is defined as the use of new information and communication technologies, including web-based Internet applications, to give citizens and businesses easier access to government information and services; likewise, e-government aims to provide better quality services, and allow more opportunities to participate in democratic institutions (Fang, 2002).

Citizen-centric e-government strives to achieve three objectives: universal usability, accessibility, and democratic participation to e-government services. Universal usability measures the degree to which a service is usable to everyone, regardless of users' biological,

cultural, educational, and social features. Shneiderman's (2000) defines universal usability as "having more than 90% of all households as successful users of information and services at least once a week" (p.85). The vital key that controls the success of universal usability is to recognize diverse users and their needs (Lazar, 2007). It is every user, not the "average" user upon whom the information and communication system should be based. This point has been broached in several ways, including by choice of web design and by methods employed to satisfy users' preferences. Researchers (Nantel and Glaser, 2008) provide evidence of the need to increase usability on websites, especially with regard to native language and culture. Websites should be designed to be capable of being used by every user. Baker (2006) further reinforces that user's ability is much more than just enhanced web-Usability; it is a way of giving needed help via online services, user-assistance, navigation, legitimacy, information architecture, and accessibility accommodation. In their work, Lazar (2006) and Horton (2006) propose a user-centered design approach as a possible choice to deal with meeting the needs of all users.

The second desired outcome of e-government services is accessibility. "Accessibility" references the test run to determine whether users have an issue with 'digital divide,' or, as more clearly defined by Belanger and Carter (2009), a lack of access and skills. A majority of people find themselves restricted by access, rather than competence, when it comes to internet use (Reddick, 2012). Therefore, it is essential to better enable citizens to interact more readily with government service portals twenty-four hours a day, seven days a week. Additionally, accessibility is strongly related to universal design, which is not a part of usability. Riley-Huff (2012) has shown that a desire to achieve web usability goals derives more from a better understanding of current standards for web accessibility than from building an inaccessible website. He illustrates that using flash to build web content creates barriers, or restricts users

altogether from accessing websites. Developing accessible websites that are more user-friendly for everyone is necessary. It is often the case that unless web designers understand the user's needs, they may not appropriately address them when establishing a webpage. Some observers of web accessibility believe that internet service delivery could transform government information and delivery services into a nonhierarchical or two-way interaction (Gore, 1993; West, 2004). Brown and Brudney (2004) conclude that recommendations to improve accessibility have demonstrated that "hierarchical, top-down, control-oriented approaches" are not optimal at pinning down users' needs or reducing costs. Stowers (2002) has emphasized the importance of looking at the problem of 'digital divide,' which essentially outlines how effective e-service will ultimately be. However, Shneiderman (2000) develops a model with three challenges, suggesting that changing technology, diverse users, and user knowledge can play crucial roles regarding accessibility within government websites.

The idea that one must first determine the user and his/her abilities plays a significantly bracing factor in the universal usability and web accessibility of e-government services. Bertot and Jaeger (2006) point out three major obstacles. First, a supporting role in handling a broad range of hardware, software interference, and network access is a daunting hurdle to both users and e-governments. With the rapid development of information communication technology, users are discouraged from catching or keeping up with advances in hardware, operating systems, and network protocols. Second, it is challenging to accommodate diverse users within a variety of backgrounds, knowledge, skills, ages, genders, disabilities, conditions, incomes, and so forth. To help web developers address individual differences, web contents are posited to accommodate those needs. Third, it is problematic when users' actual knowledge falls below what required for them to use specific information technology.

The third reason for which e-government services to exist is for greater democratic participation. Democratic participation, as defined by Finkel (1985), is a practice of participating in various public activities and empowerment in decision making and public work. Web-based participation is regarded as a way of democratic governance (Moon, 2002). Democratic participation, according to Warren (2002), consists of providing equal opportunities to participate in education, decision-making, voting, and the like. E-government services are highly correlated with citizen's satisfaction in public activities. One study criticizes the fact that not all government website designers pay attention to the bottom-up approach (or user-centered design), which focuses on not only on users with disabilities, but on all users. This is a clear indication that research about the "digital divide, digital literacy, and digital inclusion" is not addressing the technology that is accessible on the internet, but rather is promoting citizen engagement in the necessary skills required for technology (Jaeger, Bertot, Thompson, Katz, & DeCoster, 2012). Jaeger, Bertot, Thompson, Katz, & DeCoster (2012) focus on serving the needs of all users. Others are concerned about the "digital divide," that obstacle of disparity in usage caused by language barriers, individual purchasing power, or profound problems in using technology, in addition to organizational factors (Sipior & Ward, 2005; Nantel & Glaser, 2008; Helbig et al., 2009). The driving force of user satisfaction with e-services lies in bridging the "digital-divide" gap and creating an easy entry point for multiple users to employ e-services multiple times. Kotamraju and Geest (2011), however, encourage a shift in research direction from an information-driven concept of access to ICT to a user-driven concept of concerns about users' abilities. Sipior & Ward (2005) describe how gaps between internet access, the use of technology, and computer skills are decreasing when provision of access to IT and training in computer skills are accounted for. The digital divide, according to Ferro, Helbig, & Gil-Garcia (2011), is

described as a gap between supply (how e-government initiatives are implemented) and demand (the differences among people in why and how, and when they use e-government services).

E-participation engages users in different levels of policy-making. In other words, citizens' interactions vary by the degree of e-participation and policy-making process. While Macintosh (2004) provides a useful framework for considering e-participation, there is not much research in the area. For example, there is no comprehensive analysis of using ICT to estimate actual cost in the promotion of e-participation; nor has there been evaluation methodology based on clear assessment criteria and participation indicators; finally, a better understanding of the factors that contribute to E-participation success and failure could inform others as they deploy 'enabling, engaging, and empowering' adaption in their practices. Furthermore, e-participation has a significant connection with education. Saglie and Vabo (2009) show that citizen involvement in political activities increases with age and education. Other applications are based on the idea that involvement generates types of social media for citizen engagement. Therefore, electronic government requires educating people before moving forward in order to reach the greatest degree of e-participation.

BILINGUAL E-GOVERNMENT SERVICES

To provide citizen-centric e-services, it is critical to take into consideration of the important demographic features of our constituency. The American population has been growing larger and more diverse (Mackun & Wilson, 2011). In 2010, the US population grew to 4.5 percent of the world's total population and ranked third for overall world population. Also, the change in population rose by 9.7 percent (27.3 million) from 2000 to 2010. The Western and Southern regions of the United States grew by 10.5 % when compared to the Midwest and

Northeast. Hispanic populations in this country continue to grow, while the white populations are decreasing overall. From 2000 to 2009, the population increase for the nation was 25,582,000 persons of the total population, while the increase for the Hispanic population was 13,113,000 (8,050,000 individuals aged 16 to 64 years, and 2,311,000 aged 55 years and over) (US Census Bureau, 2012).

On a state level, California has the largest population with 37.3 million (US Census Bureau, 2010). On the county level, Los Angeles County in California is the most populous with 9.8 million residents, compared with Harris County of in Texas (4 million residents) and Cook County, Illinois (5 million residents). Further, at the city level, Los Angeles, San Diego, and San Jose had the greatest population increases from 2000 to 2010. California is noted for its diverse population and the largest Hispanic population in the US. California, the most populous state, is located on the West Coast. From 2000 to 2010, California's Hispanic population grew by 13,654,969 people (US Census Bureau, 2013). Compared to the Hispanic population, California's White population has increased by 3,528,334 (US Census Bureau, 2013). The White population in the United States is set to fall to minority status at same point in the next generation.

In 2011, the Hispanic population was 16.7 percent of the US total, and that growth occurred dramatically in the state of California. This one demographic characteristic alone reveals a significant demand for bilingual services.

Bilingual services are provided to ensure equal opportunities and access to public information and services for those whose primary language is not English. The emphasis on

bilingual services is for effective communication, for equal human rights for non-English language speakers, and for public services that are approachable to all.

One reason for the emphasis on demanding bilingual service might be explained by the needs of Hispanics employees to operate in a government system without barriers or hindrances of any kind, and to have better, effective communication. Spanish is the second most common language in the country, and is spoken by over 30% of the population. Throughout the Southwestern United States, long-established Spanish-speaking communities coexist with large numbers of more recent Hispanophone immigrants. According to the US Labor force in 2011, Hispanics comprised 15% of the US labor force in public services, understanding the point that bilingual service should not be neglected. Another reason for the increased demand for bilingual services is the growing trend for bilingual service websites. Many perspectives from Anthopoulos, Siozos, Tsoukalas (2007) focus on bilingual services research and contributions in web design. Those studies reinforce the special demand in California for bilingual services. The Dymally-Alatorre Bilingual Services Act of 1999 requires that "state agencies that serve a substantial number of non-English-speaking people employ a sufficient amount of bilingual persons in order to provide certain information and render certain services in a language other than English." Several studies have shown that the delivery of e-government services lag behind when it comes to recognizing the growing needs of bilingual employees who provide a variety of services to individual whose first language is not English. Those services include Paralingual web design suggested by Segovia, Jennex, Beatty (2009), and bilingual selections proposed by Al-Omari (2006).

Few studies have researched the extent to which bilingual services can be offered by e-government or the bilingual resources and services currently available in government. Thus,

there is lack of in-depth information that web developers can use to design web services to meet users' demand.

THE DEMAND AND SUPPLY OF E-GOVERNMENT SERVICES

A multitude of studies examine the adoption of e-government and elaborate on the practice of online services with regard to e-government offerings. Early researchers were interested in discussing the issue of the supply side of e-government offerings. Moon (2002) criticizes the adoption of e-government services on the shortage of information technology specialists. Edmiston (2003) shows that e-government services are restricted by the financial costs associated with the purchase of technological operations or marketing. Reddick (2005) demonstrates that government interaction with citizens has changed and finds that even if electronic services have visible operations, or readily available information about convenient services, they are scarcely used. Holden, Norris, and Fletcher (2003) look at local government and notice that adoption of e-services depends on the supply side of government offerings.

A lot of research investigates the adoption of e-government services in regard to the supply side. Reddick (2005) concentrates on how e-government offers services to government (G2G), business (G2B), and citizens (G2C). Schwester (2009) examines the factors that most impede the adoption of e-government applications. His findings show that municipalities with higher operating budgets, more full-time IT staff, and technical resources are more likely to implement a comprehensive e-government platform. Moon's (2002) study also examines e-government at the municipal level, using a data-base of 2000 e-government surveys. The author analyzes how 'size' and 'type of government' contribute to greater financial and technical support, as well as greater personnel capacities and privacy concerns. The author concludes that many municipal e-governments are still in their infancy and have not performed up to their

expected outcomes due to cost savings, downsizing, etc. Edmiston (2003), states that adopting e-services has a beneficial effect that improves government services. It reduces costs and enhances the democratic process. Holden, Norris and Fletcher (2003) employ a survey developed by Moon (2002) to evaluate the adoption of e-government, and compare larger municipalities from e-government at the local level, and conclude that e-government at this level is still 'muddling through.' Based on his analysis of city websites and his surveys of web development officials, Ho (2002) demonstrates that the adoption of e-services in many cities encompasses one-stop shopping and customer-oriented web design. The article also establishes that external collaboration and networking is used over technology in the website development process. Ho's article analyzes the socioeconomic and organizational factors that are related to cities' progressiveness in web development. The factors identified by the study include insufficient staff, lack of funding, and the problem of digital divide among racial groups.

In order to study the demand side of e-government services, it is important to analyze the willingness of citizens to use government websites along with the quality of government website design. Web-based interaction enhances citizens' perception of e-government. Citizens desire to experience easy access as well as free access to those services (Goings, Young, Hendry, 2003). Technology could serve to bridge this gap between government and citizens for addressing users' needs. Kumar, Mukerji, Butt, and Persaud (2007) perceived usefulness, ease of use, trust, and perceived risk as four determinants to citizen's interaction and recognized that those factors will influence whether citizens will use e-services or not. A case study, presented by Kumar, Mukerji, Butt, and Persaud (2007), revealed that the vast majority of Canadians visit government websites to obtain information, rather than interact or transact directly with the government personnel. To conclude, a better understanding of why and how citizens use government websites, and their

general dispositions towards e-government, is an important research issue and should be a focal point for the e-government adoption strategy.

Much recent research examines the quality of web pages using different perspectives. Tseng, Hsu, & Chuang (2012) argue that most websites are not suitable for users over fifty-years old. Empirical data from another study concludes that citizens are inclined to use the internet on the basis of information exchange (Liu, Liao, Sung & Peng, 2012). The success of the web design is determined by the extent to which all users are engaged.

The demand for e-services is positively related to the development of e-government: the recognition of current trends and the demands of residents. Based on Kumar, Mukerji, Butt, and Persaud's (2007) model, e-government begins by distributing information, followed by the transaction process. The transformation of e-government has tended to react in an interactive way with citizens. Schwester (2009) adds a participatory framework that reemphasizes the offering of internet applications which connect citizens with public administrators, decision-makers, and even elected officials. Citizens are the central focus of e-government services. Islam (2009) views citizen-centricity and the integration of different layers of federal, state, local governments as two points on which to concentrate to increase users' satisfaction with e-government services.

Several research studies have been based on the theoretical model of supply and demand to assess whether e-government services had made the shift from supply factors to demand factors. Dimitrova and Chen (2006) emphasize supply in their research, and place the focus on the citizen-government relationship using demographic, psychological, and political features as demand factors. E-government is successful for addressing both supply and demand factors, but it is necessary to introduce more development processes into the mix in order to achieve a greater,

cohesive e-democracy and to improve connections between citizens and governments (Watson and Mundy, 2001).

As shown in Table 1, many variables have been identified toward interactions in the government websites. Although some factors are used differently over time, most of them have a similar purpose. One of the most used factors is population size, chosen by various authors for several reasons: reduction of shared rate per cost, more resources, and status of facilities (Moon, 2002; Reddick, 2009; Patel and Jacobson, 2008; Rana, Williams & Kumar, 2012). E-government services cannot exist in isolation. Financial factors and IT staffs are extremely important to consider (Nurdin, Stockdale, and Scheepers, 2012; Schwester, 2009).

Additionally, cost-effectiveness and consistency have positive effects on centralized technology, generally controlled by a City-Manager or Mayor's government (Ho and Ni, 2004; Patel and Jacobson, 2008). Recently, the demands of a growing Hispanic population have increased attention in this area (Prieger and Hu, 2008).

Outsourcing is rarely studied as a defining factor of e-government service adoption, but it becomes a common practice in government agencies. However, the Hispanic speaking population is the primary group referenced when discussing bilingual online government services. Table 1 presents government offerings in websites as they pertains to six sub-categories based on the supply model, and deals with available resources regarding government capacities for providing bilingual services. Additionally, Table 1 describes the needs for non-English language speakers as they fall into one sub-category, depending upon whether or not the demand model deals with those regarding bilingual service needs. This study emphasizes the demand-factors (as opposed to the supply-factors) that influence e-government adoption. Each variable is defined and justified (See Table 1).

[Table 1 about here]

This paper uses the supply and demand analysis to develop two hypotheses for adoption of e-government services. Those hypotheses are interrelated with supply and demand theory, a term used by economists to characterize the bilingual services provision where the amount of resources dedicated to represent e-governments' capacities. Consequently, when there is a shift toward more demand, than increase results in a greater bilingual services provision.

The first hypothesis states:

H_1: *Governments with more capacity for e-services will be more likely to provide bilingual services*.

The logic is that government provision of bilingual services is resource driven. If resources are limited, bilingual services provisions will be immediately reflected in e-government services at the city and county level, resulting in less government-citizen interaction, little to no online transaction, and less transparent governance. Despite limited resources, bilingual services should still be effective and efficient. Based on the actual needs of non-English language users, e-government will reach target populations only when bilingual services function productively. For example, governments can provide more effective services by focusing on sophisticated in web designs in order to be more competitive.

The first hypotheses (H_0 & H_1) have been discussed by academic professionals. According to Moon (2002), for example, it is generally believed that e-government service adoption is affected by available resources such as size, type, and personnel capacities of the government in question. The view is that there are different supply-side factors; accordingly, governments provide e-services, make those services available on the internet, offer online

transactions, involve citizens in decision making such as e-voting, and meet all needs in a timely manner.

The logical hypothesis related to demand should be:

H_1: *Governments facing a need for bilingual services are more likely to provide bilingual services.*

However, given the constraints of government capacity in providing e-services at the local level, we anticipate that we could not reject the null hypothesis. For example, Kumar, Mukerji, Butt, and Persaud (2007) stress that it is necessary to first establish the connection between provision of services and the needs of users. Their study shows that knowing the reason and the method of citizens' experiences with government websites provide better results for successful e-government adoption. The view here is that all the demand-side factors (ease of use, the usage behavior, users' perception, users' intention, users' preferences such as free access to e-government offerings, etc.) facilitate government enhancement of e-services for all citizens.

RESEARCH METHOD

In order to analyze the provision of bilingual services (PBS) and bilingual service usability (BSU), this research uses California government websites (counties and cities) to test the hypothesis that government provides more bilingual services based on the amount of resources for e-services and the demand for bilingual services rising from an ever-increasing bilingual population.

This research paper uses California because of its Hispanic population size and the fact that it is the largest state. California has the largest percent distribution of the Hispanic population. According to the 2010 Census, 27.8 percent of the Hispanic population lived in

California as compared to other states (Texas 18.7%, Florida 8.4%). The Hispanic population comprised 16.7% of the US total population and the shift is trend is becoming ever more dramatic, especially in the state of California. Hispanics encompass 38.1% of California's total population. The total Hispanic population in 2011 had increased more than 4% from 2000. With over 12% of the total US population, California is the largest state, and ranks as the third largest area in the United States. California's large population brings with it a number of unique characteristics, including its diversity. California's diversity presents a variety of races. In the 2011 US Census, California's "two or more races" rate was 2.3 % higher than the national rate. The "two or more races" rate in California is 4.2% compared to the national rate of 2.4%.

This research uses web evaluation to analyze the quality of bilingual services in websites, so we start by considering the provision of bilingual services (PBS) as the dependent variable, illustrated by two categories: functional (1) and dysfunctional services (0). Functional bilingual services represent the accessible, operational, performing channels including translators, electronic bilingual documents, parallel websites, and so forth. Services include, for example, translating official web pages and documents (applications, notices, regulations) into a number of different languages, and ensuring that those internal or external documents have been constantly updated or safeguarded by the Information Technology Department. Dysfunctional services are those that fail to fulfill functional bilingual services. The goal is to examine the use of bilingual services based on the 1 & 0 scale.

Based on Lynch and Horton's (2009) concept of usability, we also use this content analysis to investigate different levels of bilingual services as a measure of the effectiveness of website usability. Bilingual service usability (BSU) is the second dependent variable. The five stages of bilingual service usability (BSU) include:

0) no provision for bilingual services,

1) one-button translation without functions,

2) Spanish description tag with reading comprehension,

3) bilingual translation document,

4) primary homepage translation, and

5) an English-Spanish or a parallel website.

The bilingual usability data was taken from California government websites and was rated using the 0-5 scale described above to evaluate the effectiveness of bilingual services offerings. Included in the analyses is data from 40 countries' and 195 cities' official websites.

Searching county/city websites, this research was carried out in Feb 2013. We found that 13 of 58 California counties have bilingual services rooted in their official websites. California cities account for 81 of 485 bilingual websites. The relative frequency rate of the provision for bilingual services in California cities is 5% less than California counties. The percentage offering bilingual services is 17% for city websites and 22% for county websites. Data from both counties and cities shows a less than 25 % provision of bilingual services in 2012. For bilingual service usability, the most effective web design, a 5 on the web usability scale, is less than 5% for both county and city websites (cities: 5%; counties: 3%)(See Tables 1 and 2).

[Table 2 & 3 about here.]

This research requires several explanatory variables which depend on interviews and secondary data, including the Census Bureau and the Cities Annual Report. In Table 5, centralized IT Department (CIT), outsourcing (OUT), and form of government (FoG) are

explanatory variables used to evaluate the supply factors through reviewing government web sites and conducting interviews via phone and email.

[Table 4 about here.]

Those variables are represented by binary data (0 or 1). Centralized IT Department (1) and (0) refer to the presence of a centralized IT Department in government (1) and in-house web design is represented by (0). Outsourcing (OUT) is represented by others' web design (1) and self-design (0). In terms of form of government (FoG), 0 stands for the mayor-council government and 1 stands for council-manager government. Getting the accurate read of IT employees was not easy due to a sensitive issue in relation to the unemployment /employment situation. Another reason why interviewees found it difficult to provide an exact number of IT employees is that some people work as non-IT employees doing actual IT jobs, while some play roles of temporary supports for web design. Therefore, this research gathers the approximate numbers of IT employees with interviewees in county government. In addition, this research includes three explanatory variables, i.e., the Hispanic population (HPOP), size of population (POP), and revenue per capita (REV). The size of population (POP) is defined as the total population in counties or cities. Both the Hispanic population and size of population were collected from the 2010 Census, along with the 2010 American Community Survey (ACS) 1 year estimates. This research also collects revenue data from the Cities Annual Report published by the California State Controller's Office. Revenue per capita (REV) refers to the income that governments receive from taxes. The Hispanic population is defined as the percentage of

Hispanic or Latino population as well as the only demand factor in this research. Table 5 summarizes these variables.

Because some independent variables of the cities and counties are unavailable, the county sample was reduced from 58 to 40 and the city sample from 485 to 195 as shown in Table 5 and Table 6.

[Table 5 & 6 about here]

RESULTS

The outcomes of binary logistic regression analysis establish the significant relationship between Hispanic population, form of government and whether the government website provides bilingual services. The county level analysis in Table 7 shows that Hispanic population (HPOP) and form of government (FoG) exhibit significantly positive coefficients. The coefficient for the variable Hispanic population (HPOP) is 0.103 and the efficient for the variable of the form of government (FoG) is 1.991. The findings thus show that larger government (therefore larger scale of economy) is more likely to provide bilingual services. The findings also indicate that professional manager (council-manager form of government) may as a matter of fact encourage the offering of bilingual website.

The ordinary least square method (OLS) is also used to examine the relationship between the dependent variable and six independent variables as stated previously. In this research, the 0-5 scale is developed to measure level of bilingual services or bilingual usability in government websites (BSU). Table 7 presents the significant positive coefficient of Hispanic population (0.058) and the significant negative coefficient of outsourcing (OUT). The results exhibit higher

quality of bilingual offerings in county government websites when the county has a majority

population of Hispanics. However, the negative value for outsourcing indicates a negative

relationship between the quality of bilingual web service and outsourcing. Given these results,

this research cannot reject the hypothesis, stating that governments facing a greater need for

bilingual services are more likely to provide bilingual services. The findings lead us to conclude

that county government has taken the Hispanic population factor into consideration when

deciding to provide bilingual services, but that outsourced government websites are less likely to

provide quality bilingual services.

[Table 7 about here.]

The logistic regression and OLS model are again used to investigate the probability of the

occurrence of explanatory variables for the provision of bilingual services (PBS) in city websites.

Table 8 presents the significantly positive coefficient of the Hispanic population (HPOP), the

size of population (POP) and the centralized IT department (CIT).

The coefficients for the variable Hispanic population (HPOP), the size of population

(POP) and the centralized IT department (CIT) are equal to 0.016, 0.06 and 0.952, respectively.

The t Statistic shows that these variables are significant at the usual level of 5 %. These findings

exhibit that whether or not to provide bilingual services is determined by the higher percentage

of Hispanic or Latino population, the larger overall population size, and a centralized

government with a single Information Technology department. Thus, this research provides

evidence that the provision of bilingual services is a result of capacity and demand. Bilingual

service provision can be explained by cities with a larger percentage of the Hispanic population, large population, and a centralized IT Department.

To examine the usability of bilingual services, this research performs OLS . Table 8 presents the significant positive coefficients of the size of population size (POP) and centralized IT department (CIT). The coefficient of population size (POP) is 0.001 and the coefficient of centralized IT department is 0.442. Thus, this research cannot reject the hypothesis, stating that quality of bilingual web services in city governments depends on resource availability. Furthermore, population size and centralized IT Department can influence the quality of bilingual web services. In other words, a large population has a higher capacity of supplying more resources, and a centralized IT Department can advise city governments to offer high quality of bilingual services. In addition, a city with a centralized IT department designs higher quality bilingual web services, compared to those who don't have a single office to handle city government websites. The lack of significant coefficient in the demand side has remained a challenge for bilingual web provision at the city level of government.

DISCUSSIONS

Various limitations deserve to be mentioned. Sample bias is considered the greatest limitation of this research. First, sampling bias has a potential impact on our research findings because generalization results in threats to external validity when our research chooses selected samples and applies them broadly to California governments. Data acquisition is especially difficult because the access to official documents is both time-consuming and often not available to the public. Conversely, probability sampling (randomly selecting the official websites of 195

of the 485 cities and 40 of the 58 counties in California) prevents me from having a bias process. Finally, our findings are only valid for California.

The purpose of this research is to assist the government in better developing and operating websites. For this reason, this research has selected the state of California and analyzed government websites in county and city levels. Many governments did not provide bilingual services through their websites, despite a strong demand from a large group of Hispanics. Further, bilingual service provision is defined by resource availability. At the county level, IT capacity is critical to service provision, whereas size of population is vital to bilingual service offerings at the city level. To ensure bilingual service usability, governments have developed bilingual infrastructure support services. However, some cities do not develop bilingual web services, while other cities fail to design citizen-oriented websites. Additionally, outsourcing may affect the quality of bilingual service provision by way of cutting costs and streamlining operations; professional managers may affect the outcomes of service provisions by way of affecting goals and trainings or dealing with financial issues. Nevertheless, the service will never be used if it does not meet citizen's needs. Providing user-needed services results in the success of e-government adoption. In this case, many cities and counties did not provide bilingual services despite the fact that the provision of those services would reduce the digital divide. Therefore, focusing on improving the bilingual service usability, city and county government not only makes the website look "professional" to avoid blame, but also strive to do more with less, and provide the maximum practical involvement of citizens in the development of web design for the desired services. Meeting citizens' demands can be achieved by coordinating and monitoring, in conjunction with users, management, and information technology. Indeed, there is a need for government to hold vendors of public services accountable for the quality of web services. For

example, public practitioners are recommended to annually assess web functions available for bilingual users to ensure website efficiency and maintainability.

Governments may consider a systematic database management for editing and updating data, as well as conduct needs assessment prior to alteration of the service flow chart. Also, there is a need for government to establish a call center, where contact support and customer services are readily available if users have any questions raised during e-services use. Citizens also can contact service representatives via email. A further suggestion for public managers would be to supervise expansion of interconnection between agency processes by disseminating best practices.

Indeed, there is a need for IT professionals to implement secure and continual service improvement, and a future need for governments to focus on the practice of governmental information-sharing, increasing the sharing between greater numbers of public agencies and improving the relay system, which enhances transparency. A future need for public professional organizations is to promote citizen participation and enhance democratic governance with across the board communication and information sharing. Governments may need to enhance internet networking and PC penetration rates in order to reduce the issue of digital divide.

CONCLUSION

The current e-services provision could not meet the demands of citizens. Despite of the increase in Hispanic population, the majority of the government agencies in California counties and cities have not developed bilingual e-services. By using a sample of California cities and counties, this research concludes e-service provision capacity is the primary key for bilingual service provision. When evaluating bilingual service offerings and usability for California county

and city government websites, this research concludes that IT capacity is most the critical of resources at the county level, whereas population size is regarded as the most important asset at the city level. Although the findings exhibit citizen-centric awareness regarding current bilingual e-services provision for 195 California cities and 40 California counties, the quality of bilingual service is still not guaranteed. Outsourcing and council manager driven government are two factors that affect better bilingual services in response to internet users' needs and digital divides.

The implications of the alignment between user, management, and IT highlight public administration in the evolution of e-services adoption. From the democratic governance perspective, e-government adoption is necessary in order to put emphasis on both the supply and demand sides. The aim of e-government is not only in the offerings of services, but also in the accountability that follows to create service usability, to make services efficient, and to ensure that e-governance is effective. In addressing citizen demand, the involvement of citizens in the process of web development has been given primary focus in e-government reform. In order to make services available to every citizen, public administrators need to bridge the digital divide by enhancing internet networking and PC penetration rates. In addition, implementing secure and continual service improvements become crucial issues for New Public Administration.

This research analyzes the supply and demand of bilingual e-government services. The findings point to continued future research efforts in several directions. First, the application of the research framework can be extended to other e-government services in a way to enhance service quality. Second, the study of bilingual service provisions can be extended to other jurisdictions such as other states within the US, or even other countries; likewise, further comparative research can be conducted. Third, additional demand or supply factors of e-

government can be investigated. The study also demonstrates the need to develop best practices

to inform practitioners in providing citizen oriented e-government services.

REFERENCES

Aldrich, J., Bertot, J. C., & McClure, C. R. (2002). E-government: initiatives, developments, and issues. *Government Information Quarterly*, 19, 349−355.

Al-Khouri, A. M. (2011). An innovative approach for e-government transformation. *International Journal of Managing Value and Supply Chains*, 2(1), 22-43.

Al-Omari, H. (2006). E-government architecture in Jordan: a comparative analysis. *Journal of Computer Science*, 2(11), 846-852.

Alshehri, M., & Drew, S. (2010). Challenges of e-government services adoption in Saudi Arabia from an e-ready citizen perspective. *Education*, *29*, 5-1.

Anthopoulos, L., Siozos,P., Nanopoulos, A., & Tsoukalas, I. A. (2006). The bottom-up design of e-government: a development methodology based on a collaboration environment. *E-Service Journal*, 4(3), 3-24.

Anthopoulos, L. G., Siozos, P. & Tsoukalas, I. A. (2007). Applying participatory design and collaboration in digital public services for discovering and re-designing e- government services. *Government Information Quarterly*, 24, 353-376.

Baker, D. L. (2006). Website usability of the most populous counties in the United State. *Journal of E-Government*, 3(3), 65-89.

Belanger, F., & Carter, L. (2009). The impact of the digital divide on e-government use. *Communications of the ACM*, 52(4), 132-135.

Bensghir, T. K. and Yildiz, M. (2002). E-government in Turkey. *Turkish Public Administration Annual*, 27-28, 41-57.

Bertot, J. C. & Jaeger, P. T. (2006). User-centered e-government: challenges and benefits for government web sites. *Government Information Quarterly*, 23, 163-168.

Brown, M.M. & Brudney, J. L. (2004). Achieving advanced electronic government services: Opposing environmental constraints. *Public Performance & Management Review,* 28(1), 96-113.

Chiang, J. (2011). *2009-2010 Cities Annual Report*. Retrieved from http://www.sco.ca.gov/Files-ARD-Local/LocRep/0910cities.pdf.

Deursen, A. V., Dijk, J. V. & Ebbers, W. (2006). Why e-government usage lags behind. *EGOV,* 269-280.

Dimitrova, D. V. & Chen, Y. C. (2006). Profiling the adopters of e-government information and services: the influence of psychological characteristics, civic mindedness, and information channels. *Social Science Computer Review*, 24,172-188.

Ennis, S. R., Rios-Vargas, M. & Albert, N. G. (2011). The Hispanic population: 2010. *U S Census Bureau, May 2011.* Retrieved from http://www.census.gov/prod/cen2010/briefs/c2010br-04.pdf

Edmiston, K. D. (2003). State and Local E-Government: Prospects and Challenges. *The American Review of Public Administration*, 33, 20-45.

Fang, Z. (2002). E-government in digital era: Concept, practice, and development. *International Journal of the Computer, the Internet and Management*, 10 (2), 1-22.

Ferro, E., Helbig, N. C. & Gil-Garcia, J. R. (2011). The role of IT literacy in defining digital divide policy needs. *Government Information Quarterly*, 28(1), 3-10.

Finkel, S. E. (1985). Reciprocal effects of participation and political efficacy: a panel analysis. *American Journal of Political Science*, 29 (4): 891-913.

Goings, D. A., Young, D. & Hendry, S. H. (2003). Critical factors in the delivery of e-government services: Perceptions of technology executives. *Communication of the International Information Management Association*, 3(3), 1-14.

Gore, Al. 1993. *From Red Tape to Results: Creating a Government That Works Better and Costs Less.* New York: Times Books.

Graham, S. (2002). Bridging urban digital divides? Urban polarization and information and communications technologies (ICTs). *Urban Studies*, 39(1), 33-56.

Grant, G., & Chau, D. (2005). Developing a generic framework for e-government. *Journal of Global Information Management*, 13(1), 1-30.

Hai, J.C. (2007). *Fundamental of development administration.* Selangor: Scholar Press.

Halchin, L. E. (2004). Electronic government: Government capability and terrorist resource. *Government Information Quarterly*, 21, 406−419.

Helbig, N., Gil-Garcia, J.R., & Ferro, E. (2009). Understanding the complexity of electronic government: Implications from the digital divide literature. *Government Information Quarterly*, 26, 89-97.

Ho, A. T. K. (2002). Reinventing local governments and the e-government initiative. *Public Administration Review*, 62 (4), 434-444.

Ho, A. T. K. & Ni, A. Y. (2004). Explaining the adoption of E-government features: A case study of Iowa county Treasurers' Offices. *The American Review of Public Administration,* 34(2), 164-180.

Holden, S. H., Norris, D. F., & Fletcher, P. D. (2003). Electronic government at the local level: progress to date and future issues. *Public Performance & Management Review*, 26 (4), 325-344.

Horst, M., Kuttschreuter, M., & Gutteling, J. M. (2007). Perceived usefulness, personal experiences, risk perception and trust as determinants of adoption of   e-government services in The Netherlands. *Computers in Human Behavior*, *23*(4), 1838-1852.

Horton, S. (2006). *Access by Design: A guide to Universal usability for Web Designers*. Berkeley: New Riders.

Hwang, S. D., Choi, Y., & Myeong, S. H. (1999). Electronic government in South Korea: Conceptual problems. *Government Information Quarterly*, 16(3), 277−285.

Islam, P. (2009). Citizen-centric e-government: the next frontier. *The Kennedy School Review*, 103-108.

Jaeger, P. T. (2003). The endless wire: e-government as global phenomenon. *Government Information Quarterly*, *20*(4), 323-331.

Jaeger, P. T., Bertor, J. C., Thompson, K. M. & Katz, S. M. & DeCoster, E. J. (2012). The intersection of public policy and public access: digital divides, digital literacy, digital inclusion, and public libraries. *Public Library Quarter*, 31(1), 1-20.

Jaeger, P. T., & Thompson, K. M. (2003). E-government around the world: lessons, challenges, and future directions. *Government Information Quarterly*, *20*(4), 389-394.

Jaeger, P. T. and Thompson, K. M. (2004). Social information behavior and the democratic process: information poverty, normative behavior, and electronic government in the united States. *Library & Information Science Research*, 26 (1), 94-107.

Kotamraju, N. P. & Geest, T. M. V. D. (2011). The tension between user-centered design and e-government services. *Behavior & Information Technology*, 31(3), 261-273.

Kumar, V., Mukerji, B., Butt, I., & Persaud, A. (2007). Factors for successful e-government adoption: A   conceptual framework. *The Electronic Journal of e-Government,* 5(1), 63- 76.

Luarn, P. and Lin, H.H. (2003). A customer loyalty model for e-service context. *Journal of Electronic Commerce Research*, 4(4), 156-167.

Lazar, J. (2006). *Web Usability: A User-Centered Design Approach.* Boston: Addison-Wesley.

Lazar, J. (2007). *Universal Usability: Designing Computer Interfaces for Diverse User Populations.* New York: Wiley.

Liu, S. H., Liao, H. L.,Sung, Y. H. & Peng, Q. D. (2012). Communal and exchange relationships and the effects of norms on internet participation. *Social Behavior and Personality*, 40 (6), 993-1004.

Lynch, P.J. and Horton, S. (2009). Web Style Guide: Basic Design Principles for Creating Web Sites. London: Yale University Press.

Macintosh, A. (2004). Characterizing e-participation in policy-making. *Proceedings of the 37th Hawaii International Conference on System Sciences*, 5, 1-10. Hilton Waikoloa Village Island of Hawaii, January 5-8, 2004.

Mackun, P. and Wilson, S. (2011). Population distribution and change: 2000 to 2010. *U S Census Bureau, March 2011*. Retrieved from http://www.census.gov/prod/cen2010/briefs/c2010br-01.pdf.

Mahrer, H. and Krimmer, R. (2005). Towards the enhancement of e-democracy: identifying the notion of the 'middleman paradox.' *Information Systems Journal*, 15(1), 27-42.

Moon, M. J. (2002). The evolution of e-government among municipalities: rhetoric or reality? *Public Administration Review*, 62(4), 424-433.

Nantel, J. & Glaser, E. (2008). The impact of language and culture on perceived website usability. *Journal of Engineering and Technology Management, 25 (1-2), 112-122.*

Nkwe, N. (2012). E-Government: Challenges and Opportunities in Botswana. *International Journal of Humanities & Social Science*, 17(2), 39-48.

Norris, D. F. & Reddick, C. G. (2013). Local e-government in the United States: transformation or incremental change? *Public Administration Review*, 73(1), 165-   175.

Nurdin, N., Stockdale, R. & Scheepers, H. Benchmarking Indonesian Local E-Government. *PACIS 2012 Proceedings,* 115.

Patel, H. and Jacobson, D. (2008) Factors Influencing Citizen Adoption of E- Government: A Review and Critical Assessment. *ECIS Proceedings,* 176.

Prieger, J. E. & Hu, W. M. (2008). The broadband digital divide and the nexus of race, competition, and quality. *Information Economics and Policy*, 20 (2), 150-167.

Rabaiah, A. & Vandick, E. (2009). A strategic framework of e-government: generic and best practice. Electronic Journal of E-Government, 7 (3), 241-258.

Rana, N., Williams, M. & Kumar, D. Y. (2012). E-Government adoption research: A meta-analysis of findings. *ECIS Proceedings,* 3.

Reddick, C. G. (2009). The adoption of centralized customer service systems: a survey of local government. *Government Information Quarterly*, 26 (1), 219-226.

Reddick, C. G. (2005). Citizen interaction with e-government: from the streets to servers? *Government Information Quarterly* 22, 38-57.

Reddick C. G. (2012). *Public Administration and Information Technology.* Burlington, MA: Jones & Bartlett Learning.

Riley-Huff, D. A. (2012). *Making Libraries Accessible: Adaptive Design and Assistive Technology. Chicago, IL:* Char Booth.

Saglie, J. & Vabo, S. I. (2009). Size and e-democracy: online participation in Norweigian local politics. *Scandinavian Political Studies*, 32 (4), 382-401.

Schwester, R. (2009). Examining the barriers to e-government adoption. *Electronic Journal of e-Government*, 7 (1), 113-122.

Segovia, R & Jennex, M. E. (2006). The use of paralingual web pages to improve trust in e-government web sites   in regions of highly bilingual populations. Retrieved from http://www.irma-international.org/viewtitle/32980/

Segovia, R. H., Jennex, M. E. & Beatty, J. (2009). Paralingual web design and trust in e-government. *Electronic Government Research*, 5(1), 36-49.

Shneiderman, B. (2000). Universal usability. *Communications of the ACM*, 43(5), 84-91.

Sipior, J. & Ward, B. (2005). Bridging the digital divide for e-government inclusion: A United States case study. *The Electronic Journal of e-Government*, 3(3), 137-146.

Stowers, G. N. L (2002). *The state of federal websites: The pursuit of excellence.* Arlington. VA: The PricewaterhouseCoopers Endowment for the Business of Government.

Tseng, K. C.,Hsu, C. L. & Chuang, Y. H. (2012). Acceptance of information technology and the internet by people age over fifty in Taiwan. *Social Behavior and Personality*, 40 (4), 613-622.

U. S. Census Bureau. (2013). *Race and Hispanic or Latino in the United States*. Retrieved from
    http://factfinder2.census.gov/faces/nav/jsf/pages/community_facts.xhtml.

U. S. Census Bureau. (2012). Table 10. Resident population by race, Hispanic origin, sex and
    age: 2000 and 2009. Retrieved October 8, 2011, from
    www.census.gov/compendia/statab/2012/tables/12s0010.pdf.

Warkentin, M., Gefen, D., Pavlou, P.A. & Rose, G. M. (2012). Encouraging Citizen adoption of
    e-Government by building trust. *Electronic Markets*, 12 (3): 157–162.

Warren, M. E. (2002). What Can Democratic Participation Mean Today? *Political Theory*, *30*(5),
    677.

Watson, R. T. and Mundy, B. (2001). A strategic perspective of electronic democracy.
    Communications of the ACM, 44 (1), 27-30.

West, D. M. (2004). E-Government and the transformation of service delivery and citizen
    attitudes. *Public Administration Review*, 64(1), 15-25.

Table 1. Empirical Studies of the Supply and Demand of E-Government

Factors		Studies
Supply	Population Size	Moon (2002), Reddick (2004), Patel and Jacobson (2008), Rana, Williams, Kumar Dwivedi (2012)
	Revenue	Nurdin, Stockdale, and Scheepers (2012);
	IT Employees	Schwester (2009)
	Centralized IT Department	Ho (2002)
	Outsourcing	(No research found)
	Form of Government	Ho (2002), Holden, Norris, and Fletcher (2003); Patel and Jacobson (2008)
Demand	The Hispanic population	Prieger and Hu (2008)

Table 2. Frequency Distribution for the Provision of Bilingual Services in 2012

Provision of Bilingual Services (PBS)	Frequency			
	Cities		Counties	
Yes (1)	81	17%	13	22%
No (0)	404	83%	45	78%
Total	485	100%	58	100%

Table 3. Frequency Distribution for Bilingual Service Usability in 2012

Bilingual Service Usability (BSU)	Frequency			
	Cities		Counties	
0	404	83%	43	74%
1	17	4%	1	2%
2	36	7%	7	12%
3	2	0%	3	5%
4	3	1%	2	3%
5	23	5%	2	3%
Total	485	100%	58	3%

Table 4. Summary of Variables and Descriptions of Counties/ Cities

Variables name	Description
Dependent variable	
Provision of Bilingual Services (PBS)	1=Provision of bilingual services
	0= No provision of bilingual services
Bilingual Service usability (BSU)	Measurement scales for the quality of bilingual service usability (0-5):
	0=No provision for the bilingual services
	1=One-button translation without functions
	2=Offering Spanish description tag for the pages that would not be correctly understood or well received by Spanish speakers.
	3=Making bilingual documents available on the website
	4=Translating entire current English website content page into Spanish
	5=Creating an English-Spanish or a parallel website
Explanatory variables	
Demand factors	
The Hispanic population (HPOP)	Percentage of Hispanic or Latino (of any race) population in counties of California
Supply factors	
Size of country (POP)	Total population
Revenue (per capital) (REV)	Local government finance in 2007
Centralized IT department (CIT) (city only)	1=Centralized IT department ; 0=No centralized IT department
IT employees (ITE) (county only)	Total amount of IT employees in counties of California
Outsource (OUT)	1=Outsource counties' website ; 0 =Design counties' website by their own
Form of government (FoG)	0=Mayor-council government; 1=Council-manager government

Table 5 Descriptive Statistics of California Counties

Variable Name	N	Means	STDEV	Min	Max
Dependent variable					
Provision of Bilingual Services (PBS)	40	0.30	0.46	0	1
Bilingual Service Usability (BSU)	40	1	1.55	0	5
Independent variables					
Demand factors					
% Hispanic Population (HPOP)	40	32.66	16.73	8.50	80.40
Supply factors					
Size of Population (POP in thousands)	40	104	179	7	1071
Revenue (per capital) (Rev in thousands of $)	40	1.60	0.50	0.70	3
Centralized IT Department (CIT)	40	0.90	0.30	0	1
IT Employees (ITE)	40	58.35	116.01	0	700
Outsourcing (OUT)	40	0.23	0.42	0	1
Form of government (FoG)	40	1.45	0.50	1	2

Data sources: 2010 U.S. Census Bureau & Chiang, J. (2011). *2009-2010 Cities Annual Report*. Retrieved from
http://www.sco.ca.gov/Files-ARD-Local/LocRep/0910cities.pdf.

Table 6. Descriptive Statistics of California Cities

Variable Name	N	Means	STDEV	Min	Max
Dependent variable					
Provision of Bilingual Services (PBS)	195	0.18	0.39	0	1
Bilingual Service Usability (BSU)	195	0.51	1.29	0	5
Independent variables					
Demand factors					
% Hispanic Population (HPOP)	194	39.13	24.90	5.10	96.70
Supply factors					
Size of Population (POP in thousands)	195	88	314	0.70	4094
Revenue (per capital) (Rev in thousands of $)	195	233	1361	1	16275
Centralized IT Department (CIT)	194	0.20	0.40	0	1
outsourcing (OUT)	195	0.59	0.49	0	1
Form of government (FoG)	195	0.57	0.5	0	1

Data sources: 2010 U.S. Census Bureau & State of California: Cities Annual Report, Fiscal Year 2009-2010

Table 7. The Results of OLS and Logistic Regression for Counties

Dependent variable	PBS_COUNTIES (Logistic Regression) N=40	Dependent variable	BSU_COUNTIES (OLS) N=40
Explanatory variables		Explanatory variables	
Constant	-6.677(0.035)**	Constant	-1.039(0.340)
Demand factors		*Demand factors*	
Hispanic Population (HPOP)	0.103(0.016)**	Hispanic Population (HPOP)	0.058(0.000)***
Supply factors		*Supply factors*	
Size of Population (POP)	0.004(0.173)	Size of Population (SP)	0.001 (0.398)
Form of Government (FoG)	1.991(0.055)**	Form of Government (FG)	0.709(0.112)
Revenue (REV)	0.707(0.520)	Revenue	0.035(0.934)
Outsourcing (OUT)	-2.157(0.115)	Outsourcing (OUT)	-1.312(0.031)**
IT Employees (ITE)	-0.001 (0.832)	IT Employees (ITE)	-0.001(0.607)
Centralized IT Department (CIT)		Centralized IT Department (CIT)	
		Observations	
Omnibus test	0.018	Adjust R^2	0.316
-2LL	33.598	F-test	4.003
Cox & Snell R^2	0.317	p-value	0.040

Note: *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table 8. The results of OLS and Logistic Regression for Cities

Dependent variable	Provision of Bilingual Service (Logistic Regression) N= 195	Dependent variable	Bilingual Service Usability (OLS) N= 195
Explanatory variables		Explanatory variables	
Constant	-2.984(0.000)***	Constant	0.157(0.543)
Demand factors		*Demand factors*	
Hispanic Population (HPOP)	0.016(0.052)*	Hispanic Population (HPOP)	0.004(0.352)
Supply factors		*Supply factors*	
Size of Population (POP)	0.006(0.041)**	Size of Population (SP)	0.0010.085)*
Form of Government (FoG)	0.208(0.618)	Form of Government (FG)	0.185(0.34)
Revenue (REV)	-0.002(0.12)	Revenue (REV)	0.000(0.117)
Outsourcing (OUT)	0.421(0.311)	Outsourcing (OUT)	-0.053(0.786)
IT Employees (ITE)		IT Employees (ITE)	
Centralized IT Department (CIT)	0.952(0.042)**	Centralized IT Department (CIT)	0.442(0.071)*
		Observations	
Omnibus test	0.029	Adjust R^2	0.023
-2LL	171.627	F-test	1.758
Cox & Snell R^2	0.07	p-value	0.11

Note: *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.