

Citizen-centric Perspective on the Adoption of E-Government in the Philippines

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Abstract: Information and communications technologies (ICTs) and the Internet are widely used as strategic means to improve the efficiency and effectiveness of governments and the accessibility of government information and services to citizens. In the Philippines, the government has prepared elaborate plans to enhance implementation of e-government in the country. Thus, it is only fitting to investigate the state of the adoption of e-government in the country not only to monitor progress of its implementation but to further improve access of citizens to government information and services. However, due to the inherent disparities in socio-demography, access to ICTs, Internet use as well as in the patterns of Internet use, and awareness of available e-government services in developing countries such as the Philippines, the adoption of e-government by citizens in the country is faced with major challenges (e.g., inequitable access to information and government services, widening of the gap between advantaged and disadvantaged groups). In order to uncover the state of adoption and citizens' perception of e-government in the Philippines, this study analyzed primary data collected through a national-scale survey conducted as a result of collaboration with a private social research institution based in the Philippines. Descriptive and inferential statistics were employed to describe the state of adoption of e-government in the Philippines and examine the effects of socio-demographic factors; access to ICTs and the Internet; and attitudes toward e-government on the awareness and adoption of e-government in the country. The study further validates the findings of other empirical studies on e-government adoption found in literature.

Keywords: online public services, digital divide, logistic regression analysis

1. Introduction

Information and communication technologies (ICTs) and the Internet have transformed traditional means of communication and interaction among citizens in many countries. They have also been widely used in the private/business sector and the success of its utilization is extensively evidenced at a worldwide scale. This has caused governments and public sector organizations around the globe to become aware of their potential and consequently utilize them; thereby triggering investments into electronic services (Choudrie, et al., 2004).

In general, the employment of ICTs and the Internet in the administration of government functions and in the delivery of public services is described as electronic government or e-government. E-government helps governments to achieve greater operational and cost efficiencies in performing their administrative functions and improve public service delivery by providing efficient, convenient and less costly means in accessing government information and services. The Organisation for Economic Cooperation and Development (OECD) defines e-government as the use of ICTs, and particularly the Internet, as a tool to achieve better government (OECD, 2003). The implementation and adoption of e-government are extensively discussed in the literature produced by the OECD to monitor developments of its member countries, which are mostly developed economies, on the subject matter. It has become imperative for most members of the OECD to adopt e-government to sustain their competitiveness with regard to advancing their society and economy. On the other hand, there is only little literature on the state of e-government adoption in developing countries. Moreover, critics claim that the development of electronic public services has been primarily guided by supply side factors (e.g., availability and level of sophistication of online government services) and that technological possibilities rather than user needs have determined the design of online public services (Bertot & Jaeger, 2006); (Kunstelj, et al., 2007); (Reddick, 2005); (Schedler & Summermatter, 2007); (Ebbers, et al., 2008).

Studies on the adoption of e-government in literature can be categorized into two groups, namely, the supply-side and the demand-side (Reddick, 2005). The first group of studies is concerned on the adoption of e-government from the supply-side perspective, which deliberates factors (e.g., information technology infrastructure, financial resources for IT development, number of e-government initiatives implemented) that

are essential to the government as the supplier of public services (Reddick, 2005). On the other hand, the second group of studies mainly focuses on the demand-side perspective of e-government adoption, which explores factors that are important to the clients of the government or consumers of public services (Reddick, 2005). This study is associated with the latter group, which is the demand-side of e-government adoption, particularly the use of online government portals in accessing government information and services by citizens in the Philippines.

1.1 Background

The following subsections provide a brief background on the probable implications of the digital divide in the adoption of e-government and the local conditions and trends in the Philippines with respect to the use of ICTs and the Internet.

1.1.1 The Digital Divide

As provided in the above definition of e-Government, the Internet is the key medium or channel through which government information and services are being delivered to citizens electronically. Without access to the Internet, the potential benefits that can be derived from the adoption of e-government simply cannot be realized by both the government and citizens.

Wilson (2006) broadly defines the digital divide as the inequality in access, distribution, and use of information and communication technologies between two or more populations (Wilson, 2006). On the other hand, Fuchs (2008) reflects that technologies enable and constrain human practices that their main dimensions are the material access to them (in modern society mainly with the help of wealth as technologies are sold as commodities), the capability to use them, the capability to use them in such ways that oneself and others can benefit, and embedding institutions (Fuchs, 2008). Hence, Fuchs (2008) refers to digital divide as the unequal patterns of material access to, usage capabilities of, and benefits from computer-based information and communication technologies that are caused by certain stratification processes [i.e., social hierarchies such as age, family status, ability, gender, ethnicity, origin, language, and geography (urban/rural)] that produce classes of winners and losers in the information society, and of participation in institutions governing ICTs and society (Fuchs, 2008).

The United Nations (UN) initially considers the digital divide as primarily an issue of access to relevant information technology infrastructure compounded by the prohibitive cost of access, especially in the developing countries. As technology has proliferated, the physical and financial access barriers have given way to challenges which stem more from capacity and capability (i.e., ability and competence to use ICTs) of individuals (UNDESA, 2014).

1.1.2 Trends in ICT and Internet Use in the Philippines

The Philippines is a developing country in Southeast Asia. Based on the 2010 Philippine Census, the country has a population of more than 92 million with an average annual growth rate of 1.9% from 2000 to 2010 (Source: 2010 Census of Population and Housing, Philippine Statistics Authority). In 2013, the population in the country was estimated at about 96 million. According to the International Telecommunications Union (ITU), 37% or about 35.5 million of the country's population are using the Internet (Figure 1.1). This Internet penetration rate is almost the same as the world average and slightly higher than the average rate in developing countries.

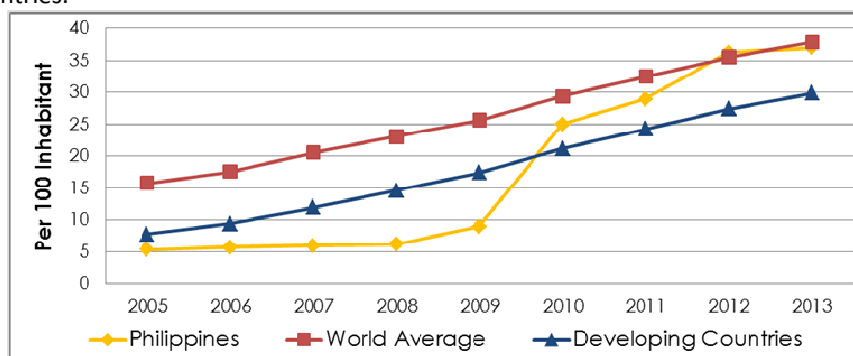


Figure 1.1: Individuals using the Internet in the Philippines from 2003 to 2013 (ITU, 2014)

However, Figures 1.2 and 1.3 show the consistent trend of lower levels of household ownership of computers and Internet access in the Philippines compared to the world average and the average rate in developing countries. It is remarkable that individual usage rates of the Internet in the country may seem to be not affected by the low levels of household ownership of computers and Internet access. According to the Asian Institute of Journalism and Communication (2009), there are more individuals accessing the Internet from cybercafés or Internet shops than from their homes or workplace in the Philippines (AIJC, 2009). To some extent, the proliferation of Internet shops in the Philippines bridges the digital divide by providing affordable access to computers and the Internet. Also, the popularity and appeal of social networking sites enable citizens to access the Internet.

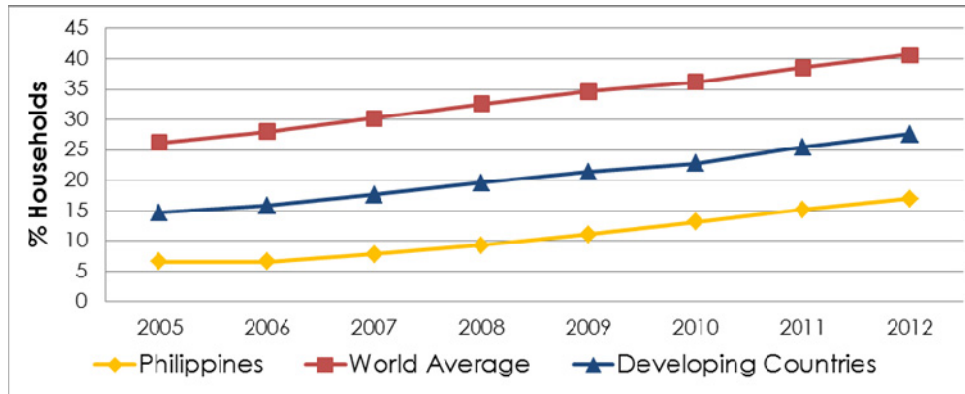


Figure 1.2: Percentage of Households with Computer in the Philippines from 2005 to 2012 (ITU, 2014)

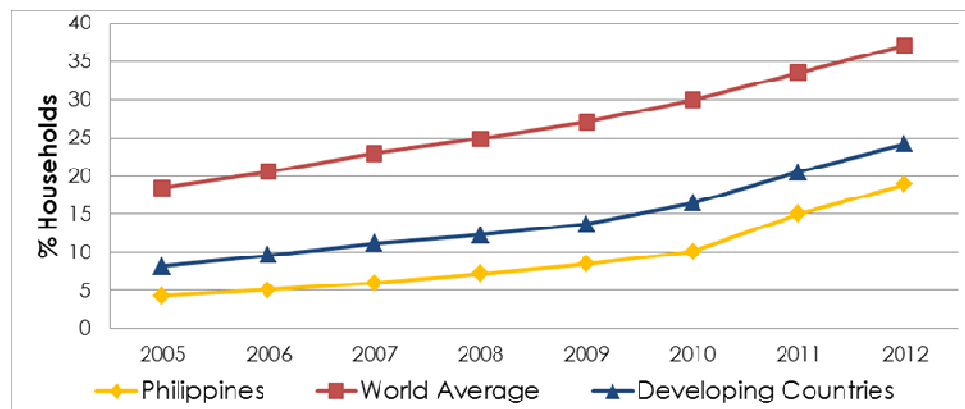


Figure 1.3: Percentage of Households with Internet Access in the Philippines from 2005 to 2012 (ITU, 2014)

In view of the above trends in ICT and Internet use, the adoption of e-government is a major policy challenge for the international community, especially for developing countries such as the Philippines. With the low rates of Internet penetration in the country, the trend of e-government adoption in the country may be lethargic, if not, defiant. Since it is by the widespread use of the Internet that developments in the adoption of e-government may be sustained, the digital divide is deemed a major barrier in realizing the potential benefits of e-government.

The Philippine government has prepared elaborate plans [e.g., Government Information Systems Plan (GISP), Philippine Digital Strategy (PDS), E-Government Master Plan] to enhance implementation of e-government in the country. As of 2012, web presence of national government agencies in the Philippines reached 93.87% (i.e., 306 out of 326 government agencies have their own websites as of December 2012 according to the Philippine National Computer Center). However, there has been no study to investigate the adoption of e-government by citizens in the Philippines to date.

1.2 Objectives of the Study

There is a threat of digital exclusion, which refers to the marginalization of individuals who do not have access to and cannot effectively use ICTs and the Internet, with the implementation of e-government, which can exacerbate already-wide gaps between advantaged and disadvantaged groups. Yet, interests of policymakers

in e-government have been directed toward the supply-side of electronic public service delivery and consequently, there are much fewer, if not lack of, data and investigations on the demand side (or from the perspective of citizens). Hence, this study intends to respond to the proposition for more demand-side oriented assessments of e-government and examine the several aspects of e-government adoption from the perspective of citizens of the Philippines. Specifically, the objectives of the study are to:

- a) determine the state of e-government adoption by citizens in the Philippines; and
- b) examine the effects of socio-demographic factors; access to ICTs and the Internet; and attitudes toward e-government on the awareness and adoption of e-government in the Philippines. Particularly, the key areas of interest in this study are the following:

Key Factors of Interest	Definition
Socio-demographic factors	The set of elements or aspects characterizing a population [i.e., age, gender, educational attainment, type of settlement (i.e., urban or rural), geographic location, socioeconomic class (i.e., proxy indicator for income level that is based on the ratio of average incomes of the different social classes established by SWS), and employment status].
Access to ICTs and the Internet	Categorized as the following: • Household ownership of computers • Internet use • Frequency of Internet use (i.e., how often individuals use the Internet) • Breadth of Internet use (i.e., range of online activities or Internet applications proficiently used by individuals)
Attitudes toward e-government	Categorized as follows: • Trust in e-government (i.e., explained by willingness to provide personal information on government websites) • Perceived usefulness of online government portals.

2. Literature Review

There are several theoretical frameworks that explain how and why individuals adopt new technologies, among others, Theory of Reasoned Action (TRA) (Fishbein & Ick, 1975); Technology Acceptance Model (TAM) (Davis, 1989); Theory of Planned Behaviour (TPB) (Ajzen, 1991); Diffusion of Innovations (DOI) Theory (Rogers, 1962); and Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh, et al., 2003). Based on said theoretical frameworks, there were several empirical studies undertaken in different countries to analyze e-government adoption. Table 2.1 shows a list of related studies on e-government adoption conducted in several countries. In detail, it summarizes several determinants of e-government adoption, validated in said studies, using different conceptual models/theories on ICT acceptance.

Table 2.1: Related Studies on E-Government Adoption

Proposed Determinants of E-Government Adoption	Conceptual Models Used	Country	Supported Literature
Disposition to trust, trust of Internet, trust of the government, and perceived risk	TRA	USA	(Belanger & Carter, 2008)
Perceived ease of use, compatibility and trustworthiness	TAM and DOI	USA	(Carter & Belanger, 2005)
Perceived usefulness and compatibility	TAM and TPB	Singapore	(Fu, et al., 2006)
Perceived usefulness, personal experiences, risk perception, and trust	TPB	Netherlands	(Horst, et al., 2007)
Perceived usefulness, ease of use, perceived risk, trust, compatibility, external influences, impersonal influence, self-efficacy, and facilitating conditions	TPB	Taiwan	(Hung, et al., 2006)

Proposed Determinants of E-Government Adoption	Conceptual Models Used	Country	Supported Literature
Information quality (perceived usefulness), system quality (perceived ease of use), and social influence	TAM	Macao	(Lai & Pires, 2010)
Trust, perceived behavioral control, and attitudes	TPB	Turkey	(Ozkan & Kanat, 2011)
Socio-demographic factors, perceived usefulness	n/a	Canada	(Reddick & Turner, 2012)
Availability of e-government services, awareness of e-government, preference to digital channels, ability and experience to use digital channels	UTAUT	Netherlands	(Van Dijk, et al., 2008)
Perceived usefulness, perceived ease of use, computer self-efficacy	TAM	Thailand	(Wangpipatwong, et al., 2008)

In other related studies, the significance of socio-demographic factors in influencing the use of online government channels were emphasized (Van Dijk, et al., 2008); (Dimitrova & Chen, 2006); (Reddick & Turner, 2012). Thus, to support the implementation of e-government, the process of identifying and managing a broad range of constituent stakeholders (i.e., various government bodies as well as citizens) must be considered not only to ensure successful implementation (Chan, et al., 2003); (Pardo & Scholl, 2002) but more specifically to improve access to government information and services.

As with the introduction of new public policies, in general, the implementation of e-government will bring about challenges to both the government and citizens. The lack of access to e-services (Chircu & Lee, 2005); (Huang, 2007); (Carter & Weerakkody, 2008), trust (Carter & Weerakkody, 2008); (Welch, et al., 2005); (Al-Sebie & Irani, 2005), individual differences (Patel & Jacobson, 2008) and the digital divide (Carter & Belanger, 2005); (Chen, et al., 2006) are few of the challenges that can impact on inclusiveness of the use of online government channels.

Online access has advantages that are impossible to replicate offline, such as the drawing together of information, independent search capacity and interactive policy consultation (OECD, 2003). However, there are significant disparities in access to ICTs and the Internet. Generally, the most disadvantaged have the lowest levels of access, yet they also often have high levels of interaction with government and if these individuals cannot access e-government services, they will miss out on many of its benefits (OECD, 2003).

The consensus in e-government adoption literature is that those with higher education and higher income are more likely to use e-government information and services (Dimitrova & Chen, 2006). In Turkey, a study was undertaken to explore the possibility of gender difference in adoption of e-government services, and found that gender differences were huge in terms of "perceived acceptance of Internet and e-government" (Akman, et al., 2005). However, according to Akman et al. (2005) these findings are in contrast to the study undertaken in the United States of America that suggested "disparity in Internet usage between men and women has largely disappeared" (Akman, et al., 2005). One possible reason for this difference could be due to cultural tendencies that lead to the adoption of different online communication styles by men and women as inferred in the study of (Cakir & Cagiltay, 2005).

In contrast to research studies supporting conceptual theories of ICT acceptance, which focus on individual characteristics of adopters (i.e., based on socioeconomic characteristics, personality traits, and communication behavior, etc.), Pilling and Boeltzig (2007) suggest that more focus should be place on systematic barriers to the Internet and e-government, such as; unequal Internet access; unequal access to e-government; problems with website accessibility and usability; that prevent people from accessing and eventually adopting technology such as the Internet and e-government (Pilling & Boeltzig, 2007).

3. Significance of the Study

According to the United Nations (2012), there is no comprehensive data available to assess citizen usages at the global level (UNDESA, 2012). Furthermore, there has not been any study or data on the adoption of e-government by citizens in the Philippines to date. Thus, this study intends to fill-in information gaps in the state of e-government adoption in the Philippines and responds to the advocacy for data initiatives and information sharing regarding e-government adoption for international benchmarking. This study also aims to pave the way for more empirical studies, and starting point for longitudinal studies, in the context of the

adoption of the Internet and e-government by citizens in the Philippines drawing insights from relevant studies presented in the literature review as basis to generate well-grounded results.

Research consistently identifies socio-demographic factors as significant predictors of access to technology (Belanger & Carter, 2009); (Hoffman, Novak, & Schlosser, 2000); (Mossberger, Tolbert, & Stansbury, 2003); (Thomas & Streib, 2003). The adoption of e-government is limited to those who have access to the technology and possess the skills necessary to utilize e-services; and as governments worldwide increasingly implement e-government services, concerns about the potential impacts of the digital divide continue to grow (Belanger & Carter, 2009). Few of the opportunities brought about by the use of ICTs and the Internet are from the benefits derived from e-government. The divide in the access to ICTs and the Internet draws exclusivity in the access to opportunities resulting from the use of such technologies, thus, making the disadvantaged seem worse off. The inequality in access to e-government is a challenge to policymakers with respect to their role of making government services equally accessible and beneficial for all.

In view of the above, it may be worthwhile to investigate the significance of socio-demographic factors, physical access to technologies and attitudes towards technologies in explaining e-government adoption in the Philippines.

4. Methodology

This study employed primary data obtained from the First Quarter 2014 Social Weather Survey, which is a national-scale survey conducted by the Social Weather Stations or SWS from March 27 to 30, 2014 in the Philippines. SWS is a private non-stock, nonprofit social research institution that is responsible for the conduct of the quarterly Social Weather Surveys, which aim to provide an independent source of pertinent, accurate, timely and credible data on Philippine economic and social conditions. The surveys include both regular time series, or items to be monitored from survey to survey, and contemporary readings, or items to be modified from time to time. The time series include many variables which SWS has been monitoring for several years, thus, providing trends in economic and social conditions. Prior to the conduct of the survey for the study, consultations between the authors and SWS transpired for the inclusion of the set of questionnaire on e-government adoption by citizens in addition to questions already included in the syndicated surveys of SWS. The inclusion of the questionnaire on e-government adoption makes the First Quarter 2014 Social Weather Survey unique among other surveys conducted by SWS.

4.1 Survey Design

The design adopted by SWS for the survey was intended to generate responses from national representative respondents. The survey data were obtained through face-face interviews of voting age adults (i.e., 18 years and above)

4.1.1 Sampling Scheme

The First Quarter 2014 Social Weather Survey was conducted in four (4) major areas in the Philippines with locations spread out throughout the country. The 4 major areas were the following: National Capital Region (NCR); Balance Luzon (i.e., Luzon excluding NCR); Visayas; and Mindanao. A number of 300 respondents were allocated for each of the 4 survey areas, which sums to a total of 1,200 respondents for the entire country. Table 4.1 shows the national-scale distribution of respondents based on the multi-stage sampling conducted by SWS.

Table 4.1: Multi-stage Sampling for Selection of Respondents

Area	Sample Province	Sample Municipality	Sample Barangays (or Villages)	Total Respondents
NCR	0	17	60	300
Balance Luzon	10	15	60	300
Visayas	5	15	60	300
Mindanao	6	15	60	300
Total	21	62	240	1,200

Source: SWS First Quarter 2014 Social Weather Survey

For each sampled barangay, five (5) households were selected by systematic sampling. Designated starting points for selection of households vary from one of the following locations: (1) a municipal or barangay hall, (2) a school, (3) barangay captain's house, (4) church, chapel or mosque, (5) health facility, or (6) a basketball court. Each numbered starting location (1 to 6) are randomly selected and the selected number also corresponds to the number of house/s counted from the starting location (i.e., if a particular barangay was randomly designated a starting location of 4, then the first sample household should be the 4th household from the starting point). Subsequent sample households were selected using a fixed interval of 5 households in between sampled ones.

For each household selected, a respondent was randomly selected among household members who are at least 18 years of age.

4.1.2 Survey Questionnaire

The survey questionnaire was translated into eight (8) local languages. The survey questionnaire was divided into two categories, i.e., Types I and II. Type I questionnaire includes survey questions designed to furnish data/information on socio-demography and access to ICTs and the Internet. This set of questions was adopted from the syndicated Social Weather Surveys conducted quarterly by SWS. On the other hand, Type II questionnaire includes survey questions designed to provide data on the adoption and perception of e-government. This set of questions was derived from the consultation between the authors and SWS. Types I and II survey questions were jointly administered by SWS during its First Quarter 2014 Social Weather Survey. Table 4.2 summarizes the topics covered in the survey questionnaire.

Table 4.2: Summary of Key Survey Questionnaire Topics of Interest

Key Topics	Details
Socio-demographic Information	Age, Gender, Educational Attainment, , Employment Status, Socioeconomic Class, Geographical Location, Type of Settlement (i.e., Urban or Rural)
Ownership of Computer and Internet Usage	Household Ownership of Computer, Use or Non-use of the Internet, Frequency of Internet Use, Types and Number of Internet Activities Undertaken
Adoption of E-Government	Awareness of Government Websites, Use or Non-use of Government Websites
Perception of E-Government	Willingness to Provide Personal Information on Government Websites, Usefulness of Government Websites

Source: Authors

4.2 Statistical Analysis

The survey data were analyzed using descriptive and inferential statistics. Descriptive statistics was used to describe the population and inferential statistics was applied to draw conclusions about the study population based upon the sample data, particularly logistic regression was used as this method suitably deals with dichotomous outcome variables, in which there are only two possible outcomes. Both descriptive and inferential statistical methods were employed to ascertain and evaluate the effects of the hypothesized/potential explanatory (independent) variables and response/outcome (dependent) variables as well as determine the extent of the association between said variables (Table 4.3).

Table 4.3: Independent and Dependent Variables

Independent Variables	Dependent Variables
• Age • Gender • Educational Attainment • Socioeconomic Status • Status of Employment • Type of Settlement • Geographic Location • Internet Use • Frequency of Internet Use • Breadth of Internet Use • Household Ownership of Computer • Trust in E-Government • Perceived Usefulness of E-Government	• Awareness of E-Government • Adoption of E-Government

Source: Author

Logistic regression allows examination of how each independent variable affects the probability of a choice by a decision-maker, possible event or outcome occurring. In logistic regression, the probability of an event occurring is given by the succeeding equations. These equations describe the calculation for the probability of usage or non-usage of online government portals:

$$P(y=J|x)=P(y=J|x_1,x_2,\dots,x_k) \quad (1)$$

$$P(y=J|x) = \exp(\beta x) / [1 + \exp(\beta x)] = \Lambda(\beta x) \quad (2)$$

where y is the dependent variable; J is the discrete choice of a respondent (e.g., 1=Yes; 0=No); x is the matrix of explanatory variables; β is the column vector for the obtained coefficients by the regression, which represents the change in the natural logarithm of $P(y=J|x)$ for each unit change in x ; and Λ is the cumulative probability density function (c.d.f.), where the probability density function (p.d.f.) is a logistic function.

To obtain the corresponding logit function, the above equation (2) is transformed into equations (3), (4) and (5):

$$\text{logit}[P(y=J|x)] = \ln\{P(y=J|x) / [1 - P(y=J|x)]\} \quad (3)$$

$$\text{logit}[P(y=J|x)] = \ln\{[\exp(\beta x) / (1 + \exp(\beta x))] / [1 - (\exp(\beta x) / (1 + \exp(\beta x))]\} \quad (4)$$

$$\text{logit}[P(y=J|x)] = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_k x_k \quad (5)$$

The odds ratio (OR), which represents the constant effect of an explanatory variable x on the likelihood that one outcome will occur, can be obtained from

$$OR = \exp(\beta) \quad (6)$$

The odds ratio is a measure of effect size and therefore provides information on the strength of relationship between the dependent and independent variables. When the value of OR is equal to 1, the explanatory variable does not affect the outcome; when $OR > 1$, a unit increase in the explanatory variable will increase the odds of the outcome by the value of OR; when $OR < 1$, a unit increase in the explanatory variable will decrease the odds of the outcome by the value of OR. Rosenthal (1996) develops qualitative descriptors of effect size for the odds ratio: OR values about 1.5 = small effect (or weak association), about 2.5 = medium (or moderate), about 4 = large (or strong), about 10 = very large (or very strong) (Rosenthal, 1996).

Figure 4.1 shows the general form of the relationship between dependent and independent variables in logistic regression.

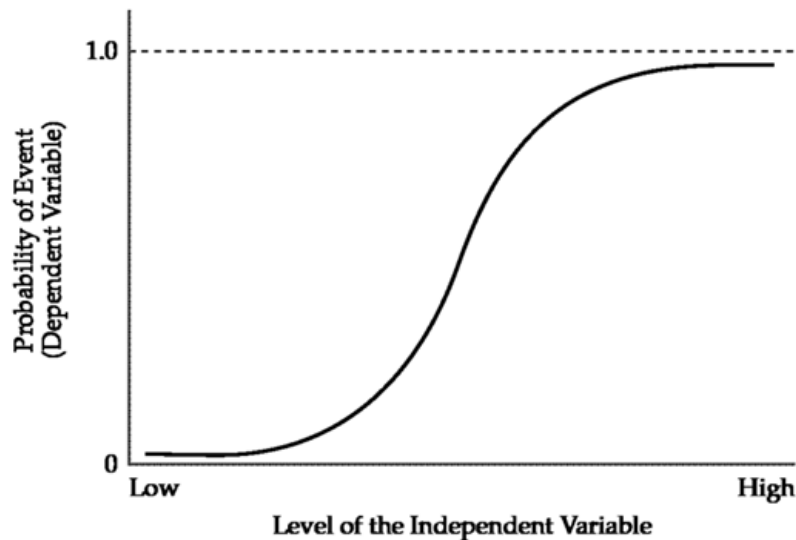


Figure 4.1: Graphical Representation of Logistic Regression

Source: (Hair, Black, Babin, & Anderson, 2009)

Logistic regression is suited to address two research objectives: 1) to identify independent variables that impact group membership in the dependent variable; and 2) establish a classification system based on the logistic model for determining group membership (Hair, Black, Babin, & Anderson, 2009).

Logistic regression was employed in this study since it is the preferred method for two-group (binary) dependent variables due to its robustness, ease of interpretation and diagnostics. Its relative strength comes in its ability to be flexible across multiple research settings, its robustness derived from a minimal set of underlying assumptions, and its similarity to multiple regression for purposes of interpretation (Hair, Black, Babin, & Anderson, 2009). It is used extensively in numerous disciplines, including medical, social science, engineering, and market research fields.

In this study, logistic regression analysis was used in analyzing the survey data to identify the significant explanatory variables and their impact on the usage of online government portals.

5. Results and Discussion

A fully effective (i.e., all answers or responses to the set of questions in the survey questionnaire were considered effective) 100% response rate was achieved since household surveys were conducted through face-to-face interviews by SWS.

5.1 Presentation of Survey Results Using Frequency Statistics

The following subsections present and summarize the aggregated responses of respondents to survey questions on access to ICTs and the Internet; attitude towards e-government; and awareness and adoption of e-government.

5.1.1 Socio-demographic Characteristics of Survey Respondents



Figure 5.1: Frequency Distribution Graphs of Socio-demographic Indicators, N=1,200

Source: Authors

5.1.2 Access to ICTs and the Internet

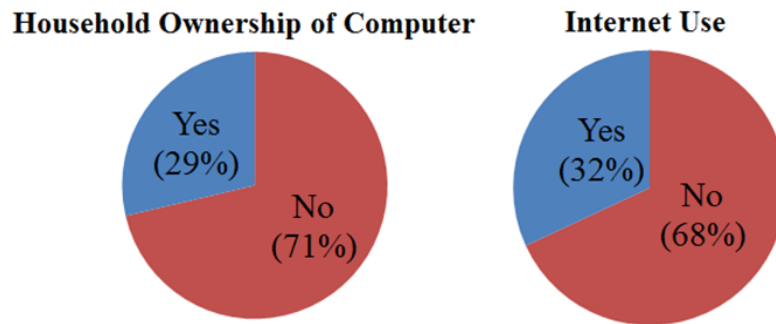


Figure 5.2: Aggregated Responses on 'Household Ownership of Computer and Internet Use', N=1,200

Source: Authors

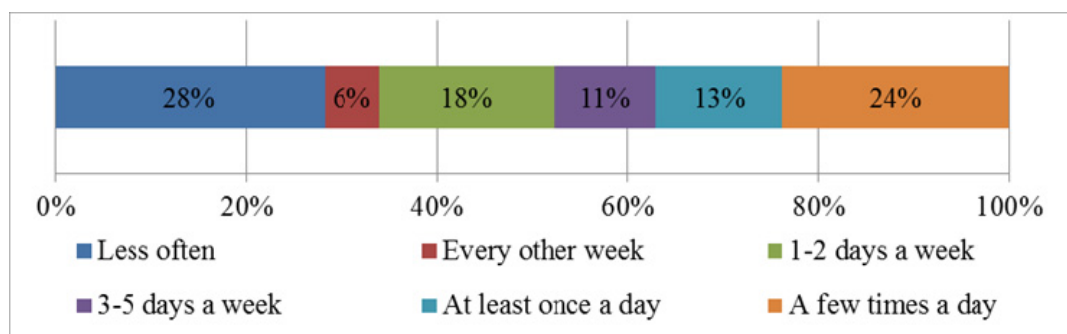


Figure 5.3: Aggregated Responses on 'Frequency of Internet Use', N=383

Source: Authors

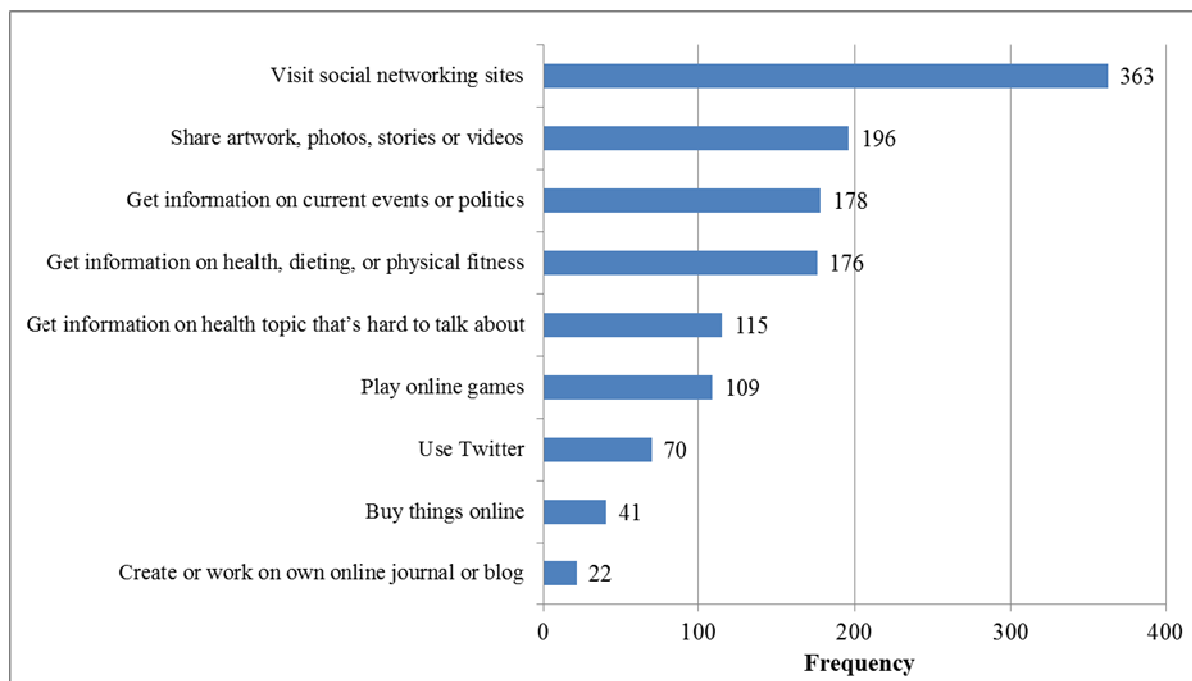


Figure 5.4: Aggregated Responses on 'Types of Activities Undertaken using the Internet' (Multiple Answers), N=383

Source: Authors

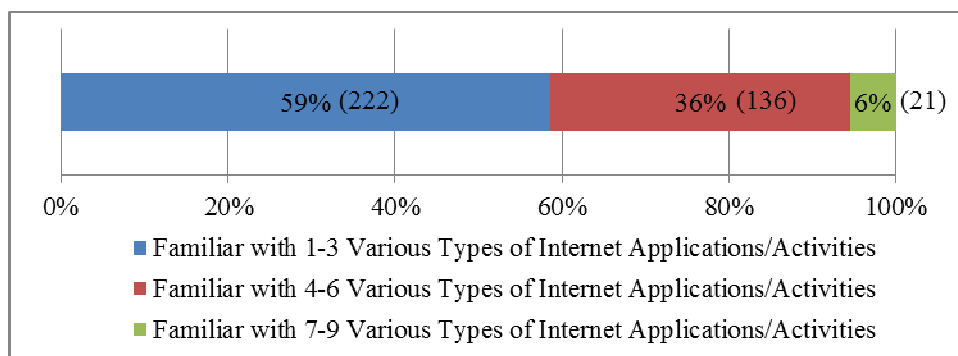


Figure 5.5: Aggregated Responses on the 'Breadth of Internet Use', N=383

Source: Authors

5.1.3 Attitudes toward E-Government

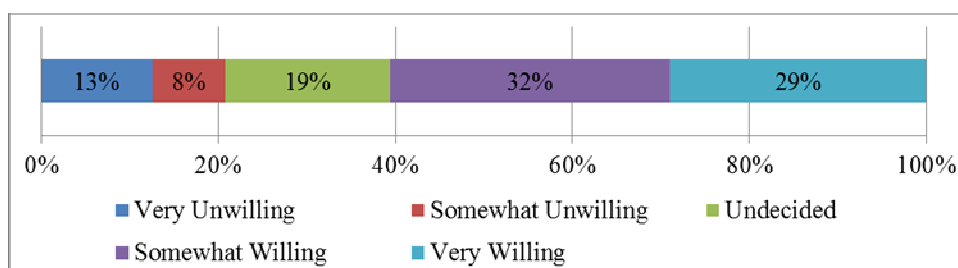


Figure 5.6: Aggregated Responses on 'Willingness to Provide Personal Information on Government Websites', N=1,200

Source: Authors

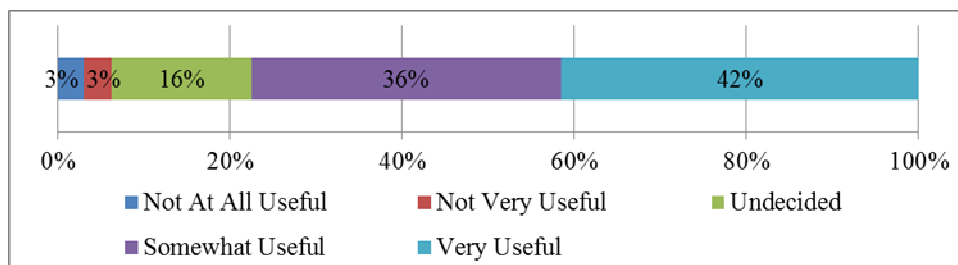


Figure 5.7: Aggregated Responses on 'Perceived Usefulness of Government Websites', N=1,200

Source: Authors

5.1.4 Awareness and Adoption of E-Government

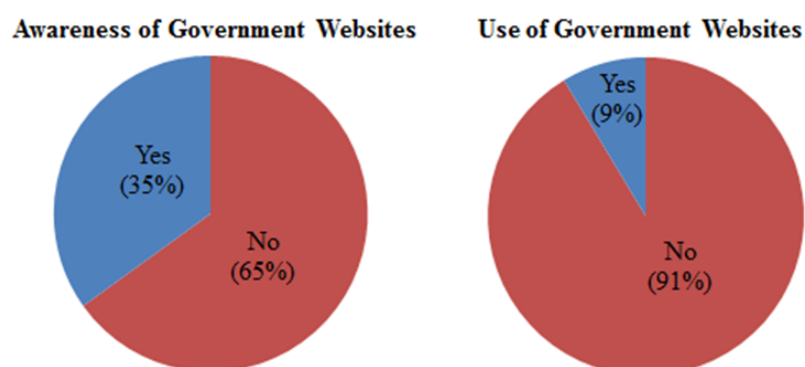


Figure 5.8: Aggregated Responses on 'Awareness and Usage of Government Websites', N=1,200

Source: Authors

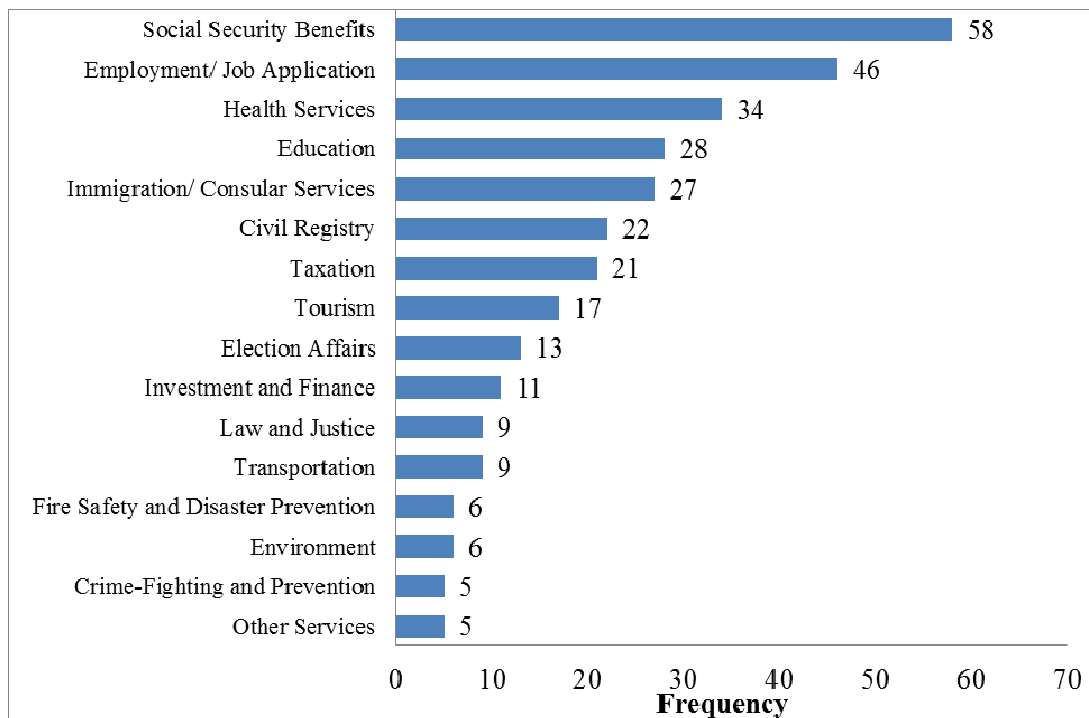


Figure 5.9: Common Government Information or Services Accessed Through Government Websites (Multiple Answers), N=104

Source: Authors

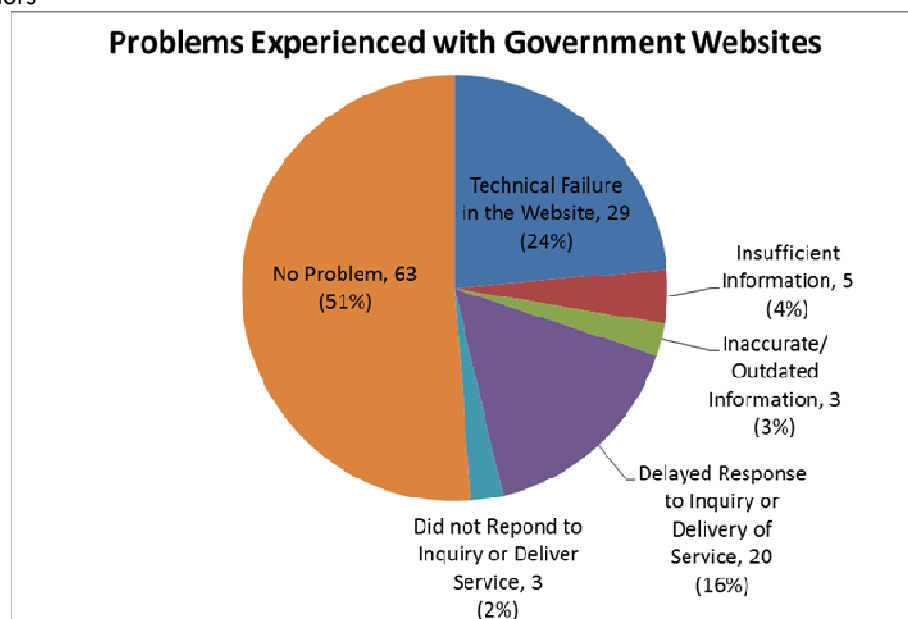


Figure 5.10: Common Problems Experienced When Using Government Websites (Multiple Answers), N=104

Source: Authors

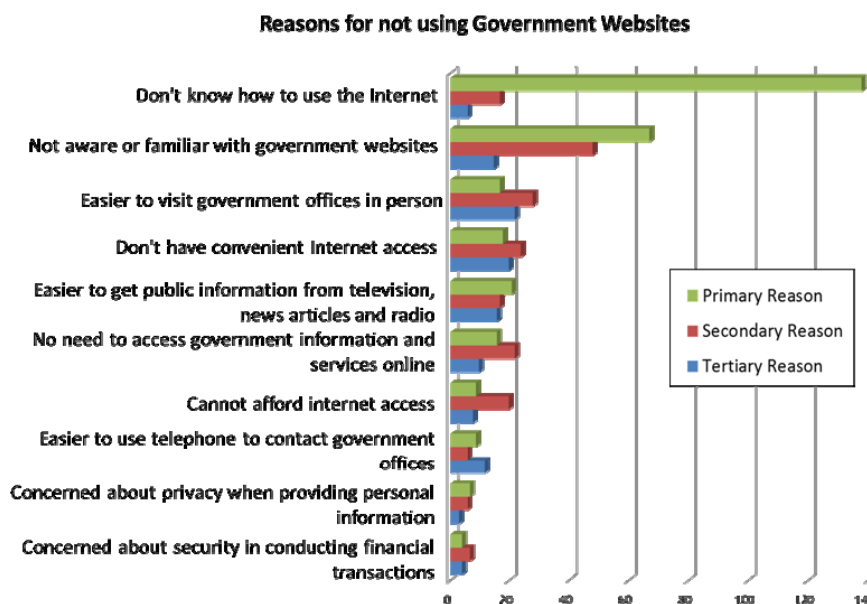


Figure 5.11 Primary, Secondary and Tertiary Reasons for not Using Government Websites (Multiple Answers), N=1,096

Source: Authors

5.2 Discussion of Survey Results

The following subsections present the descriptive analyses of the survey data presented above and some inferences supported by concepts obtained in literature.

5.2.1 Disparities in Access to ICTs and the Internet

The examination of the survey data shows that computer ownership and Internet use are generally low (Figure 5.2). With the disparities in household computer access and Internet use presented in the results of the survey, the presence of digital divide in the Philippines becomes more apparent. The lack of access to ICTs and the Internet is a manifestation of the existence of the digital divide. Where digital divide exists, access to the benefits of e-government is a challenge. According to Schradie (2011), the more frequently a person has access to the Internet, the more opportunities they have to gain the technology skills and the more time they have to be creative (Schradie, 2011).

5.2.2 Positive Attitudes toward E-Government

The respondents' willingness to provide personal information on government websites suggests that they generally find e-government trustworthy (Figure 5.6). Also, majority of the respondents perceived government websites as useful in supplementing traditional government services delivery channels (Figure 5.7). This somehow reveals how they perceive traditional service delivery channels. With traditional channels, citizens have to visit, mail or call government bodies and wait for response from government officials. Despite their efforts in attempting to interact with government bodies through traditional means, sometimes citizens are left waiting for long periods of time and sometimes accessing government services through traditional channels tend to be more costly. With e-government, citizens can receive government information and services instantly from their homes or from anywhere with the use of a computer that is connected to the Internet. Results of the respondents' reactions toward their willingness to provide their personal information on government websites and their perception on the usefulness of government websites reflect their general positive attitudes toward e-government. According to West (2005), the general public is a crucial factor in the dissemination of new technology. Owing to how they think about and utilize technology, individuals either facilitate or constrain change; if consumers are open to new technology or adept at integrating new inventions into their lives, they are going to be more receptive than if they harbor negative views about technological innovation (West, 2005).

5.2.3 Low Awareness and Adoption of E-Government

From Figure 5.8, awareness (35%) and use (9%) of government websites are generally low. Though awareness is a precondition for actual use, apparently it does not always lead to actual use.

The most commonly accessed government information or services through government websites are related with social security benefits, employment or job application and health services (Figure 5.9). While there are more e-government users that did not experience any problems with government websites, those who experienced problems mentioned technical failure in the website (e.g., website is inaccessible or unavailable, website contains broken links) and delayed response to inquiry or delivery of service (Figure 5.10) as the two most common problems. Furthermore, results show that the most identified primary reason for not using government websites is that respondents do not know how to use the Internet; and the most identified secondary and tertiary reasons are that respondents are unaware or unfamiliar with government websites and they find it easier to just make personal visits to government offices, respectively (Figure 5.11).

5.3 Evaluating the Effects of the Explanatory Variables on the Outcome Variables Using Logistic Regression Analysis

Figure 5.12 generally describes the distinct research elements exhibiting the purported relationships that exist between the hypothesized explanatory and outcome variables of this study. According to Verdegem & Verleye (2009) and Van Dijk et al. (2008), intended users of e-government must be aware of the existence of electronic public services (in order to fulfil his or her needs) before the intention to use e-government services can arise (Verdegem & Verleye, 2009); (Van Dijk, Peters, & Ebbers, 2008). Since awareness is a precondition for adoption, it is deemed prudent to also investigate the effects of the potential explanatory variables on the outcome variable “awareness of e-government”.

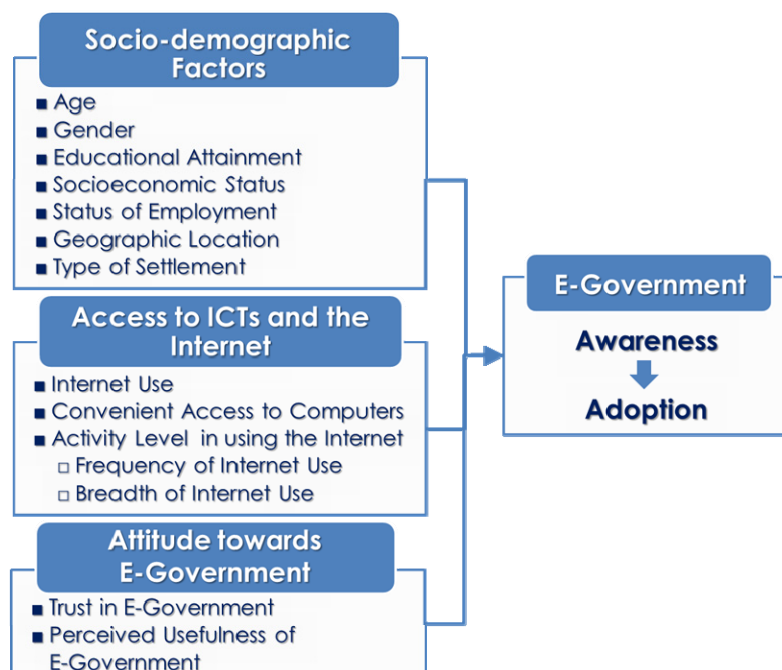


Figure 5.12: Conceptual Framework of the Study

Source: Authors

5.3.1 Logistic Regression Modelling

A total of 13 potential explanatory variables were considered in the design of the two logistic regression models corresponding to the two outcome variables awareness and adoption of e-government. While there are a total of 1,200 samples in the study, there were only 419 respondents who were aware of government websites. Correspondingly, the number of observations in the logistic regression model for “awareness of e-government” is 1,200 and the number of observations in the model for “adoption of e-government” is 419.

Logistic regression is used to find the best fitting model to describe the relationship between the dichotomous outcome variable and a set of explanatory variables. While the outcome variable takes the values 0 or 1, the potential explanatory variables were characterized into categorical and continuous variables in order to fit them in the logistic regression model. Table 5.1 describes how the outcome and the potential explanatory variables are fitted in the logistic regression models.

Table 5.1: List of Independent and Dependent Variables

Variables	Description
Age	=18 and above, continuous variable
Gender	=1 if male; = 0 if female
Educational Attainment (measured in years of schooling)	=0 if did not finished elementary school; =6 if completed elementary school; =10 if completed high school; =12 if completed vocational school; =14 if completed college; =16 if undertaken post-graduate studies
Socioeconomic Status	=1 if Class E; =3 if Class D; =10 if Class C; = 30 if Class AB [values were based on the ratio of average incomes of the different social classes established by SWS (Africa, 2011)]
Status of Employment	=1 if employed; =0 if unemployed
Type of Settlement	=1 if urban; =0 if rural
Geographic Location	=1 if NCR; =0 if Balance Luzon, Visayas or Mindanao
Internet Use	=1 if use; =0 if non-use
Frequency of Internet Use	=1 if at least 3-5 days a week; =0 if less than 3-5 days a week
Breadth of Internet Use	=1 to 9, continuous variable
Household Ownership of Computer	=1 if yes; =0 if no
Trust in E-Government	=1 if at least somewhat willing to provide personal information on government websites; =0 if other response (i.e., somewhat unwilling, very unwilling or undecided)
Perceived Usefulness of E-Government	=1 if at least somewhat useful; =0 if other response (i.e., not very useful, not at all useful or undecided)
Awareness of E-government	=1 if aware of government websites; =0 if not aware of government websites
Adoption of E-government	=1 if used/visited government websites; =0 not use/visit government websites

Source: Authors

5.3.2 Results and Evaluation of the Logistic Regression Models

Table 5.2 show the results of the logistic regression analysis.

Table 5.2: Logistic Regression Results (Odds Ratios)

Explanatory Variables	E-Government Outcome Variables	
	Awareness	Adoption
Age	1.00	0.96
Gender	0.91	1.10
Educational Attainment	1.12**	1.34**
Socioeconomic Status	1.02	1.06
Status of Employment	2.12**	0.98
Geographic Location	1.27	1.81
Type of Settlement	1.13	0.63
Internet Use	1.24	0.98
Frequency of Internet Use	1.44	1.45
Breadth of Internet Use	1.30**	1.43**
Household Ownership of Computer	0.97	4.36**

Explanatory Variables	E-Government Outcome Variables	
	Awareness	Adoption
Trust in E-Government	1.16	0.83
Perceived Usefulness of E-Government	1.82**	3.73**
No. of Observations	1,200	419
Maximum-likelihood Estimation	-645.78	-138.89
Chi-squared, (13)	261.07	191.80
Prob>Chi-Squared	0.00	0.00
Pseudo R-squared	0.17	0.41
Mean VIF	1.97	1.90

**** p-value is < .01 significance level**

Based on the results of the logistic regression analysis, both the awareness and adoption logistic regression models were found to be statistically significant (given the resulting p-value <0.05 significance level associated with the likelihood ratio chi-squared test with 13 degrees of freedom). The significance test for the model chi-square is a statistical evidence of the presence of a relationship between the dependent variable and the combination of the independent variables. Results show that there are statistically significant overall relationships between the combination of independent and the dependent variables for the awareness and adoption models. The variance inflation factor (VIF) for the independent variables are within tolerable levels (ranges from 1.10-5.11), thus multicollinearity was not a concern.

5.3.3 Interpretations of Logistic Regression Results

Tables 5.3 and 5.4 provide some qualitative interpretations of the obtained odds ratio values of the explanatory variables for the two logistic regression models based on the qualitative descriptors of effect size for the odds ratio developed by Rosenthal (1996).

Table 5.3: Qualitative Interpretations of Odds Ratio Values of the Explanatory Variables for Awareness of E-Government

Predictor Variable	Odds Ratio	Qualitative Descriptors of Strength of Association
Status of Employment	2.12	Moderate
Perceived Usefulness of E-Government	1.82	Weak
Breadth of Internet Use	1.30	Weak
Educational Attainment	1.12	Weak

Source: Author

Table 5.4: Qualitative Interpretations of Odds Ratio Values of the Explanatory Variables for Adoption of E-Government

Predictor Variable	Odds Ratio	Qualitative Descriptors of Strength of Association
Household Ownership of Computer	4.36	Strong
Perceived Usefulness of E-Government	3.73	Strong
Breadth of Internet Use	1.43	Weak
Educational Attainment	1.34	Weak

Source: Author

The logistic regression analysis on the “awareness of e-government model” reveals that the effects of explanatory variables “status of employment”, “perceived usefulness of e-government”, “breadth of Internet

use” and “educational attainment” (i.e., in descending degrees of impact) on “awareness of e-government” are significant. All four identified explanatory variables in the model were found to have positive effects/influences on the odds of the outcome variable “awareness of e-government”.

On the other hand, the logistic regression analysis on the “adoption of e-government model” uncovers that the effects of “household ownership of computer”, “perceived usefulness of e-government”, “breadth of Internet use” and “educational attainment” (i.e., in descending degrees of impact) on the adoption of e-government are significant. All four identified explanatory variables in the model were found to have positive effects/influences on the odds of the outcome variable “adoption of e-government”.

In summary, it may be inferred from the results of the study that individuals who are employed, who perceive e-government as useful, who are more skilled in using the Internet and have generally higher educational attainment are most likely to be aware of e-government. Moreover, individuals who can access computers at their home, who perceive e-government as useful, who are more skilled in using the Internet and have generally higher educational attainment are most likely to use government websites.

6. Conclusions

The study has revealed the state of adoption of ICTs, the Internet and e-government by adult citizens in the Philippines. It has reviewed several literature on the factors affecting e-government adoption in order to adequately analyze the trends or patterns in the access of government information and services through online channels across several segments and attributes of the Philippine population. It has employed inferential statistics to complement the descriptive statistical analysis conducted on the survey data of the study. By conducting logistic regression analysis, the study was successful in identifying significant potential predictors of e-government adoption in the Philippines. The results of the study further validate, to some degree, the findings of other empirical studies on e-government adoption found in literature. While results of some empirical studies that were based on theoretical frameworks on e-government adoption in literature differ in findings, this study offers another way of understanding, analyzing and designing a process to investigate the relationships among variables concerning the adoption of e-government.

The following conclusions are drawn with respect to the objectives of the study.

6.1 State of E-Government Adoption by Citizens in the Philippines

The results of the study make the existence of digital divide in the Philippines apparent. The findings indicate that there are disparities in the access to ICTs and the Internet as well as in the patterns of Internet use among the various socio-demographic groups within country. This divide impedes equality in access to information and opportunities that can be benefitted from innovating technologies. Moreover, this is seen as a challenge in the provision of government information and services through the Internet or to e-government adoption in general. This study confirms that a large portion of the population in the Philippines has not yet accessed online government portals. One of major reasons inferred is the lack of familiarity with government information and services offered over the Internet. Though promoting awareness of e-government to citizens does not ensure their adoption of e-government, it gives citizens more flexibility on how they would want to communicate or interact with the government (i.e., either through electronic or traditional service delivery channels). On the other hand, if the benefits of e-government are properly conveyed, the adoption of e-government is deemed optimistic.

6.2 Effects of Socio-demographic Factors, Access to ICTs and the Internet, and Attitudes toward E-government on the Awareness and Adoption of E-government in the Philippines

The study has successfully examined the significance of several potential predictors of awareness and, ultimately the usage of online government service channels. The combination of socio-demographic factors, access to ICTs and the Internet, and attitudes toward e-government affects the awareness and adoption of e-government among citizens. Despite the low awareness and adoption of e-government in the country, the study further reveals that citizens in the Philippines have positive general attitudes toward e-government. Their willingness to provide personal information on government websites expressed their trust in the system and their positive general perception on the usefulness of electronic service delivery channels conveys their receptivity to adopt e-government.

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References

- Adams, D., Nelson, R. & Todd, P., 1992. Perceived Usefulness, Ease of Use, and Usage of Information Technology: A Replication. *Management Information Systems (MIS) Quarterly*, June, 16(2), pp. 227-247.
- Africa, T., 2011. [Online]
Available at: <http://www.sws.org.ph/>
[Accessed 22 July 2014].
- AIJ, A. I. o. J. a. C., 2009. *Survey on Internet Access and Use by Filipino Schoolchildren*, s.l.: Asian Institute of Journalism and Communication.
- Ajzen, I., 1991. The Theory of Planned Behavior. *Organizational Behavior and Human Decision Processes*, December, 50(2), pp. 179-211.
- Akman, I., Yazici, A., Mishra, A. & Arifoglu, A., 2005. E-Government: A global view and an empirical evaluation of some attributes of citizens. *Government Information Quarterly*, 22(2), pp. 239-257.
- Alampay, G. & Umali, J., 2007. *High Impact, Pro-Poor e-Governance Applications: Identifying 'Killer Applications' and Best Practice Models of e-Governance through Community e-Centers in the Philippines*, s.l.: United Nations Development Programme (UNDP).
- Al-Sebie, M. & Irani, Z., 2005. Technical and organisational challenges facing transactional e-government systems: an empirical study. *Electronic Government, an International Journal*, 2(3), pp. 247-276.
- Armitage, C. & Conner, M., 2001. Efficacy of the Theory of Planned Behaviour: A meta-analytic Review. *British Journal of Social Psychology*, Volume 40, pp. 471-499.
- Bagozzi, R., 2007. The Legacy of the Technology Acceptance Model and a Proposal for a Paradigm Shift. *Journal of the Association for Information Systems*, April, 8(4), pp. 244-254.
- Bandura, A., 1982. Self-efficacy mechanism in human agency. *American Psychologist*, 37(2), pp. 122-147.
- Belanger, F. & Carter, L., 2008. Trust and risk in e-government adoption. *The Journal of Strategic Information Systems*, June, 17(2), pp. 165-176.
- Belanger, F. & Carter, L., 2009. The impact of the digital divide on e-government use. *Communications of the ACM - A Direct Path to Dependable Software*, April, 52(4), pp. 132-135.
- Benbasat, I. & Barki, H., 2007. Quo vadis, TAM?. *Journal of the Association for Information Systems*, April, 8(4), p. 212.
- Benham, H. & Raymond, B., 1996. Information Technology Adoption: Evidence from a Voice Mail Introduction. *Association for Computing Machinery. Special Interest Group on Computer Personnel Research (ACM SIGCPR) Computer Personnel*, 17(1), pp. 3-25.
- Bertot, J. C. & Jaeger, P., 2006. User-Centered e-Government: Challenges and Benefits for Government Websites. *Government Information Quarterly*, 23(2), pp. 163-168.
- Bhattacharjee, A., Perols, J. & Sanford, C., 2008. Information Technology Continuance: A Theoretical Extension and Empirical Test. *Journal of Computer Information Systems*, October, 49(1), pp. 17-26.
- Cachia, R., 2008. *Social Computing: Study on the Use and Impact of Online Social Networking*, Luxembourg: European Communities.
- Cakir, H. & Cagiltay, K., 2005. Effects of cultural differences on e-mail communication in multicultural environments. *The Electronic Journal of Communication*, 15(1&2).
- Carter, L. & Belanger, F., 2005. The utilization of e-government services: citizen trust, innovation and acceptance factors. *Information Systems Journal*, January, 15(1), pp. 5-25.
- Carter, L. & Weerakkody, V., 2008. E-government adoption: A cultural comparison. *Information Systems Frontiers*, 10(4), pp. 473-482.
- Castells, M., 2001. *The Internet galaxy*. Oxford, England: Oxford University Press.
- Chan, C., Pan, S. & Tan, C.-W., 2003. *Managing Stakeholder Relationships in an E-Government Project*. Tampa, Florida, s.n.
- Chen, C.-K., Tseng, S.-F. & Huang, H.-I., 2006. A comprehensive study of the digital divide phenomenon in Taiwanese government agencies. *International Journal of Internet and Enterprise Management*, 4(3), pp. 244-256.
- Chircu, A. & Lee, D. H.-D., 2005. E-government: key success factors for value discovery and realisation. *E- Government, an International Journal*, 2(1), pp. 11-25.
- Choudrie, J., Ghinea, G. & Weerakkody, V., 2004. Evaluating Global e-Government Sites: A View using Web Diagnostic Tools. *Electronic Journal of E-Government*, 2(2), pp. 105-114.
- Davis, F., 1989. Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *Management Information Systems (MIS) Quarterly*, September, 13(3), pp. 319-340.
- Davis, F., Bagozzi, R. & Warshaw, P., 1989. User Acceptance of Computer Technology: A Comparison of Two Theoretical Models. *Management Science*, August, 35(8), pp. 982-1003.
- Dimitrova, D. & 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(2), pp. 172-188.

- Dutta-Bergman, M., 2009. Theory and Practice in Health Communication Campaigns: A Critical Interrogation. *Health Communication*, November, 18(2), pp. 103-122.
- Ebbers, W. E., Pieterse, W. J. & Noordman, H. N., 2008. Electronic government: Rethinking channel management strategies. *Government Information Quarterly*, April, 25(2), pp. 181-201.
- Fishbein, M. & Ick, A., 1975. *Belief, Attitude, Intention and Behavior: An Introduction to Theory and Research*. Reading, Massachusetts: Addison-Wesley Publication Company.
- Fuchs, C., 2008. *Internet and Society: Social Theory in the Information Age*. New York, United States of America: Routledge.
- Fu, J.-R., Farn, C.-K. & Chao, W.-P., 2006. Acceptance of Electronic Tax Filing: A Study of Taxpayer Intentions. *Information & Management*, Volume 43, pp. 109-126.
- Graafland-Essers, I. & Etteggui, E., 2003. *Benchmarking e-Government in Europe and the US*. Leiden, The Netherlands: RAND.
- Hair, J. J. F., Black, W., Babin, B. & Anderson, R., 2009. *Multivariate Data Analysis*. 7th ed. Upper Saddle River, New Jersey: Prentice Hall.
- Hendrickson, A., Massey, P. & Cronan, T. P., 1993. On the Test-Retest Reliability of Perceived Usefulness and Perceived Ease of Use Scales. *Management Information Systems (MIS) Quarterly*, June, 17(2), pp. 227-230.
- Hoffman, D., Novak, T. & Schlosser, A., 2000. The Evolution of the Digital Divide: How Gaps in Internet Access May Impact Electronic Commerce. *Journal of Computer-Mediated Communication*, March.5(3).
- Horst, M., Kuttischreuter, M. & Gutteling, J., 2007. Perceived usefulness, personal experiences, risk perception and trust as determinants of adoption of e-government services in The Netherlands. *Computers in Human Behavior*, July, 23(4), pp. 1838-1852.
- Huang, Z., 2007. A comprehensive analysis of U.S. counties [rsquo] e-Government portals: development status and functionalities. *European Journal of Information Systems*, April, Volume 16, pp. 149-164.
- Hung, S.-Y., Chang, C.-M. & Yu, T.-J., 2006. Determinants of user acceptance of the e-Government services: The case of online tax filing and payment system. *Government Information Quarterly*, January, 23(1), pp. 97-122.
- Hung, S.-Y., Ku, C.-Y. & Chang, C.-M., 2003. Critical Factors of WAP Services Adoption: An Empirical Study. *Electronic Commerce Research and Applications*, 2(1), pp. 42-60.
- ITU, I. T. U., 2014. *ICT Facts and Figures*. [Online]
Available at: <http://www.itu.int/en/ITU-D/Statistics/Pages/default.aspx>
- ITU, I. T. U., 2014. *ICT Facts and Figures*. [Online]
Available at: <http://www.itu.int/en/ITU-D/Statistics/Pages/default.aspx>
- Jaeger, P., 2004. Beyond Section 508: The spectrum of legal requirements for accessible e-government Web sites in the United States. *Journal of Government Information*, November, 30(4), pp. 518-533.
- Kunstelj, M., Jukic, T. & Vintar, M., 2007. Analysing the Demand Side of e-Government: What Can We Learn from Slovenian Users?. *Electronic Government, An International Journal: Lecture Notes in Computer Science*, Volume 4656, pp. 305-317.
- Lai, C. S. K. & Pires, G., 2010. Testing of a Model Evaluating e-Government Portal Acceptance and Satisfaction. *Electronic Journal of Information Systems Evaluation*, June, 13(1), p. 35.
- Moon, M. J. & Norris, D., 2005. Does managerial orientation matter? The adoption of reinventing government and e-government at the municipal level. *Information Systems Journal*, January, 15(1), pp. 43-60.
- Moore, G. & Benbasat, I., 1991. Development of an Instrument to Measure the Perceptions of Adopting an Information Technology Innovation. *Information Systems Research*, September, 2(3), pp. 192-222.
- Mossberger, K., Tolbert, C. & Stansbury, M., 2003. *Virtual Inequality: Beyond the Digital Divide (American Governance and Public Policy series)*. Washington, D.C.: Georgetown University Press.
- NCC, P. N. C. C., n.d. [Online]
Available at: <http://www.ncc.gov.ph>
[Accessed 21 July 2014].
- Norris, P., 2001. *Digital divide: Civic engagement, Information Poverty, and the Internet Worldwide*. New York, United States of America: Cambridge University Press.
- OECD, 2003. *The e-Government Imperative*. Paris, France: OECD Publications Service.
- OECD, 2003. *The e-Government Imperative*. Paris, France: OECD Publications Service.
- Ozkan, S. & Kanat, I., 2011. e-Government Adoption Model Based on Theory of Planned Behavior: Empirical Validation. *Government Information Quarterly*, October, 28(4), pp. 503-513.
- Pardo, T. & Scholl, H., 2002. *Walking atop the Cliffs—Avoiding Failure and Reducing Risk in Large-Scale E-government Projects*. Big Island, Hawaii, System Sciences.
- Patel, H. & Jacobson, D., 2008. *Factors influencing citizen adoption of e-Government: A review and critical assessment*. Galway, Ireland, s.n.
- Pilling, D. & Boeltzig, H., 2007. *Moving toward e-government: effective strategies for increasing access and use of the internet among non-internet users in the U.S. and U.K.*. Philadelphia, Pennsylvania, Digital Government Society of North America, pp. 35-46.
- Reddick, C., 2005. Citizen interaction with e-government: From the streets to servers?. *Government Information Quarterly*, 22(1), pp. 38-57.
- Reddick, C. & Turner, M., 2012. Channel choice and public service delivery in Canada: Comparing e-government to traditional service delivery. *Government Information Quarterly*, Volume 29, pp. 1-11.

- Rogers, E., 1962. *Diffusion of Innovations*. New York, United States of America: Free Press of Glencoe.
- Rogers, E., 1995. *Diffusion of Innovations, Fourth Edition*. New York, United States of America: Free Press.
- Rosenthal, J. A., 1996. Qualitative Descriptors of Strength of Association and Effect Size. *Journal of Social Service Research*, 21(4), pp. 37-59.
- Schedler, K. & Summermatter, L., 2007. Customer Orientation in Electronic Government: Motives and Effects. *Government Information Quarterly*, April, 24(2), pp. 291-311.
- Schradie, J., 2011. The digital production gap: The digital divide and Web 2.0 collide. *Poetics*, April, 39(2), pp. 145-168.
- Segars, A. & Grover, V., 1993. Re-Examining Perceived Ease of Use and Usefulness: A Confirmatory Factor Analysis. *Management Information Systems (MIS) Quarterly*, December, 17(4), pp. 517-525.
- Sheppard, B., Hartwick, J. & Warshaw, P., 1998. The theory of reasoned action: A meta-analysis of past research with recommendations for modifications and future research. *The Journal of Consumer Research*, December, 15(3), pp. 325-343.
- Sniehotta, F., 2009. An Experimental Test of the Theory of Planned Behavior. *Applied Psychology: Health and Well-Being*, July, 1(2), pp. 257-270.
- Subramanian, G., 1994. A Replication of Perceived Usefulness and Perceived Ease of Use Measurement. *Decision Sciences*, September, 25(5-6), pp. 863-874.
- SWS, 1985. [Online]
Available at: <http://www.sws.org.ph/>
[Accessed 22 July 2014].
- Szajna, B., 1994. Software Evaluation and Choice: Predictive Validation of the Technology Acceptance Instrument. *Management Information Systems (MIS) Quarterly*, September, 18(3), pp. 319-324.
- Taylor, S. & Todd, P., 1995. Understanding information technology usage: A test of competing models. *Information Systems Research*, 6(4), pp. 144-176.
- Thomas, J. C. & Streib, G., 2003. The New Face of Government: Citizen - Initiated Contacts in the Era of E - Government. *Journal of Public Administration Research and Theory*, 13(1), pp. 83-102.
- Titah, R. & Barki, H., 2006. E-Government Adoption and Acceptance: A Literature Review. *International Journal of Electronic Government Research*, 2(3), pp. 23-57.
- Tornatzky, L. & Klein, K., 1982. Innovation Characteristics and Innovation Adoption-Implementation: A Meta-Analysis of Findings. *IEEE Transactions on Engineering Management*, February, 29(1), pp. 28-45.
- Triandis, H., 1971. *Attitude and Attitude Change*. New York, United States of America: J. Wiley & Sons.
- UNDESA, U. N. D. o. E. a. S. A., 2012. *United Nations E-Government Survey 2012*, New York, United States of America: United Nations.
- UNDESA, U. N. D. o. E. a. S. A., 2014. *United Nations E-Government Survey 2014*, New York, United States of America: United Nations.
- UN, U. N., 2013. *The Millennium Development Goals Report 2013*, New York, United States of America: United Nations.
- UN, U. N., 2014. *Background*. [Online]
Available at: <http://www.un.org/millenniumgoals/bkgd.shtml>
[Accessed 1 July 2014].
- Van Deursen, A., Van Dijk, J. & Ebbers, W., 2006. *Why E-government Usage Lags Behind: Explaining the Gap Between Potential and Actual Usage of Electronic Public Services in the Netherlands*. Krakow, Poland, s.n., pp. 269-280.
- Van Dijk, J. & Hacker, K., 2003. The digital divide as a complex and dynamic phenomenon. *The Information Society*, 19(4), p. 315-326.
- Van Dijk, J., Peters, O. & Ebbers, W., 2008. Explaining the acceptance and use of government Internet services: A multivariate analysis of 2006 survey data in the Netherlands. *Government Information Quarterly*, 25(3), pp. 379-399.
- van Raaij, E. & Schepers, J., 2008. The Acceptance and Use of a Virtual Learning Environment in China. *Computers and Education*, April, 50(3), pp. 838-852.
- Venkatesh, V., Morris, M., Davis, G. & Davis, F., 2003. User Acceptance of Information Technology: Toward a Unified View. *Management Information Systems (MIS) Quarterly*, September, 27(3), pp. 425-478.
- Verdegem, P. & Verleye, G., 2009. User-centered E-Government in practice: A comprehensive model for measuring user satisfaction. *Government Information Quarterly*, July, 26(3), pp. 487-497.
- Wangpipatwong, S., Chutimaskul, W. & Papasratorn, B., 2008. Understanding Citizen's Continuance Intention to Use E-Government Website: A Composite View of Technology Acceptance Model and Computer Self-efficacy. *The Electronic Journal of E-Government*, 6(1), pp. 55-64.
- Welch, E., Hinnant, C. & Moon, M. J., 2005. Linking Citizen Satisfaction with E-Government and Trust in Government. *Journal of Public Administration Research and Theory*, July, 15(3), pp. 371-391.
- West, D. M., 2005. *Digital Government: Technology and Public Sector Performance*. Princeton, New Jersey: Princeton University Press.
- Wilson, E. J., 2006. *The information revolution and developing countries*. Cambridge, Massachusetts: MIT Press.