Institutional and technological determinants of civil e-Participation: Solo or duet?

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ABSTRACT

Do current advances in ICT actually encourage civil e-Participation and foster new governance? This research questions an enduring controversy among scholars on the crucial factors that promote active civil participation through ICT and pursues the attributes and implications of recent high civil e-Participation in many countries. By using data gathered from 125 countries worldwide, the technological and institutional conditions under which active civil e-Participation induces are analyzed. This research verifies that the level of political institutionalization and the degree of technological development interact to affect the level of participation through ICT, and that the magnitude of this effect is different for countries with different types of online populations and different forms of political institutionalization. This implies that e-Participation has a higher probability of increase when institutions and technology act in conjunction; efforts to realize e-democracy through ICT will fail if only a technological infrastructure is considered in countries. In other words, high e-Participation could be a menace for democracy in the long run in conditions where the ICT level is high yet lacking political institutionalization.

1. Introduction

Within the academic community, many scholars have raised the question as to whether current advances in the field actually encourage civil participation and foster new governance as is commonly claimed. Many researchers have suggested that the widespread diffusion of information and communication technology (ICT) as a new communications channel is associated with higher levels of political engagement and dramatic changes in politics (Castells, 2008; Sylvester & McGlynn, 2010; Quintelier & Vissers, 2008; Tolbert & McNeal, 2003; Hooghe, Marien, & Quintelier, 2010; Bennett, Maton, & Kervin, 2008; Boulianne, 2009; Sæbø, Rose, & Skiftenes Flak, 2008; Nam, Pardo, & Burke, 2012). A new government–citizen relationship can be manifested by emphasizing the efficiency of function-oriented technologies, and further, e-governance could be an alternative to representative democracy and hierarchical governance (6 Perri, 2004; Chadwick, 2003). Such discussions on the possibility of new governance began as developments in ICT were beginning to exert direct effects on the policy-making process, extending its participatory opportunities to average citizens. Citizens enjoy access to a significant amount of information that is readily available at a cheap price through the Internet. Armed with the latest technology such as the Internet and cellular phones, smart citizens are quickly placing themselves as participants

and providers in the political and administrative process (Weber, Loumakis, & Bergman, 2003; Davis, Elin, & Reeher, 2002).

Although we acknowledge the potential for consensus building and information exchange through ICT are associated with the level of Internet access and the spread of digital devices, the mechanism is neither automatic nor natural for encouraging active civil participation (Moon, 2002; Quintelier & Vissers, 2008; Boulianne, 2009). Studies clearly show that online participation is not inherent in ICT itself and each country has selected a different path for its e-Participation utilizing newly developed technology (Rodan, 2003; Chadwick, 2001; Tolbert & McNeal, 2003; Åström, Karlsson, Linde, & Pirannejad, 2012; Cullen & Sommer, 2011). For example, using data from the 2011 survey in Spain, Vicente and Novo (2014) explore two types of e-Participation of individuals' political and social participation on the Internet. Recent findings argue that opportunities for participation thorough ICT are dependent on the context and ways in which politics and administration are conducted in different countries. Literature emphasizes that each nation's unique political institution is closely related to the level of civil participation of its constituents (Zhenga, Schachterb, & Hozler, 2014; Norris, 2011; Coleman & Shane, 2011; Lijphart, 1994; Blais & Dobrzynska, 1998).

However, little research exists to answer how the use of ICT and/or institutions could influence distinctive outcomes on e-Participation across countries (Lin, Fofanah, & Liang, 2011; Rodan, 2003; Mundy & Musa, 2010). One can note that most of the studies on e-Participation have offered case-specific and incidental rather than general and

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systematic analysis. If e-Participation is related to the specific socio-economic underpinnings and/or institutional structure of countries, then what are the specific factors and mechanism of producing different levels of e-Participation across countries?

The objective of this research is to analyze factors affecting the potential for developing online participation and the causality between these factors. This study also intends to analyze how the interaction between the political institution and technology influences e-Participation. By using data gathered from 125 countries worldwide, the technological and institutional conditions under which active civil e-Participation induces are analyzed. This research investigates that the level of political institutionalization and the degree of technological development interact to affect the level of participation through ICT, and that the magnitude of this effect is different for countries with different types of online populations and different forms of political institutionalization. The significance of these analyses is that they delineate the technological and institutional variables that affect e-Participation and provide a quantitative relationship of mutual interactions between technology and institutions. Through such analysis, we would draw the relationship between civil e-Participation and political institutions in the countries.

In the following sections, we first review the existing literature on institutional and technical variables of civil participation for our research. We then present the methodology and models used for quantitative analysis of these variables, and examine any causality between variables on e-Participation. We analyze the ways in which institutions and technological factors shape the degree of e-Participation and examine the effect of interactions between technology and institutions on e-Participation. In conclusion, we discuss the implications and significance of our study for e-Participation for the necessity of political institutionalization for the government.

2. Increasing e-Participation: institution or technology?

Online civil participation is one way of responding to the needs of citizens in a way that is not possible with the current political system (Chadwick, 2006; Shirky, 2008; Painter & Wardle, 2001). A new political process that arises from harmonious coordination and consultation resulting in a balanced network of political entities using ICT is expected to solve the problems inherent in a representative democracy (Jho, 2005). In the 2007 US Presidential campaign, candidate Barack Obama employed social networking services (SNS) as a tool to disseminate political information, raise funds, unite the political supporters, and collect policy opinion (Delany, 2009: 9–10; Milner, 2010). Citizens develop unconventional ways of political participation through resistance, aggregation of interests, as well as taking part in public opinion surveys, in addition to the conventional political practices such as traditional voting, protests, and NGO activity (Ester & Vinken, 2003; Hacker & van Dijk, 2000). Such diversification of the participation techniques gives birth to the rise of the active political participation of citizens.

Current empirical research on e-Participation involves two categories of debates: the mobilization thesis vs. the reinforcement thesis. The role of ICT on participation is controversial because ICT reinforces the existing pattern of political participation or mobilizes new participation from citizens who are indifferent about political issues. On the one hand, many criticize the view that ICT has strong potential for increasing participation by citizens (Bimber, 2008; Salter, 2004; Lunat, 2008). In the US, the Internet has had a slight impact on revising the existing pattern of face-to-face civil participation (Putnam, 2000). On the other hand, ICT seems to attract new participation by citizens who are not represented in a current political system (Jho, 2009; Coleman, Lieber, Mendelson, & Kurpius, 2008). Fraser and Dutta (2008) claim that social network services expand the scope of political participation and establish both cooperative and interactive network shifting from an elite democracy to a participatory democracy.

2.1. Technology and e-Participation

Studies clearly have shown that there is a connection between the development of ICT and e-Participation (Clift, 2004; Freschi, Medaglia, & Nørbjerg, 2009). ICT provides necessary information for elections and voting; the 'Minnesota E-democracy Project' and 'Voter-Smart Project' had increased offline civil participation in local elections of the USA (Barber, 1998a; Barber, 1998b). Elberse, Hale, and Dutton (2000) confirm in the case of D-net in the US that a certain amount of causality exists between building ICT infrastructure and civil participation. The Internet platform continuously changes and evolves to meet the client's needs, while the varying types of media generate different manners in agenda setting and political participation (Balnaves, Mayrhoter, & Shoesmith, 2004; Lawson-Borders & Kirk, 2005). Twitter, as personalized as it can be, shapes relationships and spreads issues under its unique structure defined as "follow," verifying that the very traits including the style and structure of media can influence the thinking process and the behavior of its users. By providing the information needed to understand political and electoral issues, ICT can encourage civil participation (Boulianne, 2009; Morris, 2000).

High technological infrastructure in a country thus helps to increase the level of e-Participation. In a country of high technology, civil participation through cyberspace will be implemented without substantial friction, thus promoting participation. In contrast, if a country shows low technology, there could be higher boundaries between citizens to participate in public issues. Given that technology removes barriers between citizens and increases inter-organizational transactions, we propose the following:

Hypothesis 1. High technology in a country will be positively related to the level of e-Participation.

2.2. Institutions and e-Participation

While acknowledging the extent of technological permeation in a country influences the pace, spread, and impact of e-Participation, the use of ICT alone does not automatically foster civil participation nor does it grant good governance (Bertot, Jaeger, & Grimes, 2010; Boulianne, 2009; Åström et al., 2012; Arterton, 1987). According to Boulianne, as articulated in her meta-analysis, there exists no linear relationship between the use of the Internet and the offline civil/political participation (Boulianne, 2009). Citizens have a tendency to access only the information that they want and, as a consequence, the phenomenon of political initiatives being formed only by small offline groups has not changed significantly (Hill & Hughes, 1998). A study on interest groups of the US showed that netizens have a tendency to focus on personal and non-political issues rather than political or public affairs. The Internet is unable to increase the engagement of citizens indifferent to politics, and has only limited success in increasing political participation overall (Putnam, 2000; Davis, 1999).

Despite its apparent benefits, the analysis on e-Participation also begins with the institutional context in which the ICT was initially implemented. Political institutions, such as forms of democracy or party systems, develop differently in each country and affect the democratic performance of political participation in different ways (Norris, 2011; Lijphart, 1994; Blais & Dobrzynska, 1998). Political institutions set up 'rules' for individual expression, information transmittal, and social choices (Plott, 1979: 156), and can either accelerate or slow down socio-political changes (Jackman & Miller, 1995). e-Participation has been developed in a variety of ways based upon different intuitions. Even with implementation of ICT, the ability to redefine roles and relationships in the work processes of large organizations, such as government ministries, seems to be limited, mainly due to the resistance of multi-layer authoritative bureaucracies and institutions (Fountain, 2001: 44–63). Opportunities for online participation have benefited

political elites who attempt to reinforce their own interests and demands (Rodan, 2003; Chadwick, 2001; Tolbert & McNeal, 2003). Highly developed ICT and a robust infrastructure have been used to strengthen the political power base of political leaders or to propagate the position of the government in which they maintain their position and prestige in countries (Jaeger, 2005; Chadwick, 2001). We expect that democratic institutions tend to promote e-Participation than authoritarian regimes. The differences between the institutions of the presidential and the parliamentary system, the voting age (Blais & Dobrzynska, 1998), the voter registration system (Katz, 1997), and the voting system (Blais & Carty, 1991) affect political participation to a significant degree. Discussions on the subject of newly developing e-Participation, hence, will be determined not only by technical infrastructure but also by institutional aspects (Norris, 2011; Siau & Long, 2009). The conceptualizations regarding institutions will facilitate distinct outcomes in e-Participation. We thus propose the following:

Hypothesis 2. Strong political institutions in a country will be positively related to the level of e-Participation.

2.3. Moderating effects between technology and institutions

Given that the socio-economic conditions of a country are stable, we expect that the directions of the two factors are not easily changeable. The studies of technology suggest that technology determines the level of civil e-Participation. Institutions affect the pattern of e-Participation owing to its regulation power, even though they could be affected by the political and economic conditions of a country. This means that when we consider technology and institutions simultaneously, the interaction between technology and institutions will increase each other's effects on e-Participation. In examining the effects of interaction between two explanatory variables, it is suggested that technology increases the positive influence of political institutions on e-Participation, especially when technology is high. This proposition indicates that we could find the increasing effect of technology on the positive relationship between institutions and e-Participation, when technology is high. We therefore suggest the following:

Hypothesis 3. Technology will positively increase the influence of institutions on e-Participation, especially when technology is high.

3. Research models

This study presents a model of e-Participation by comprehensively analyzing its technical and institutional aspects. The dependent variable of this study is e-Participation, which is used as a conceptual term for 'all forms of civil participation that utilize an electronic medium.' The OECD defines e-Participation as "ICT-supported participation in processes involved in government and governance" (OECD, 2003). e-Participation involves "technology-mediated interaction between the civil society sphere and the formal politics sphere and between the civil society sphere and the administration sphere" (Sæbø et al., 2008: 402). The advent of ICT allows for citizens to gather information, hold consultations, and vote online expressing their political opinions (Norris, 2002, 2004). e-Participation is recognized as a new form to increase civil participation in the political process and digital government services.[1] We note that it differs from direct political participation such as offline voting and demonstrations.

We use the UN data (UN, 2012), which comprises the results of a survey from 191 countries to measure the degree of e-Participation. The UN index consists of indices for e-information, e-consultation, and e-decision-making. The UN online participation index was developed

by evaluating the information and its quality regarding the usefulness of services in policy-making processes surveyed from each country. This index evaluates 21 functions of the provision of information and the participation services available to citizens. The UN data, considered as a legitimized index, remains meaningful in that it enumerates the diverse levels of the online activity of civil participation while other data merely tracks the records of the traditional participatory outcome such as the voting rate (Norris, 2002, 2011). We examine online participation with the voting rate, a representative index for measuring offline participation and analyze the correlation between online and offline political participation. This index is recognized by researchers and experts alike as the proper tool for examining the quality and legitimacy of online services provided by a government.[2]

The first independent variable in this study is online population, which indicates the level of technological development in a country. We assume that the presence of a large online population means that the country in question has a high level of ICT infrastructure. In other words, we use the online population as an index to evaluate the level of use of ICT in a country. To measure the online population we use the ITU (International Telecommunication Union) data (ITU, 2012). This dataset is based on information gathered by the ITU from 180 countries on their ICT infrastructure and level of utilization (Table 1).

The second independent variable is the political institution. In a study of the relationship between participation and institution, Powell (1980) links offline participation with voting turn-out and socio-economic environment, institution, and political structure as independent variables. He confirms the existence of a significant relationship between stable, democratic institution management and participation in a democratic country.[3] Norris (2002) reports that there is significant causality between political institutions and voter turn-out. We divide the political institution variables into components of freedom of speech and association and level of democracy.

The first of these components, the level of freedom of speech and association, is strongly correlated with the level of political participation. Many scholars have pointed out that freedom of expression is one of the basic elements for democracy and most likely affects civil participation (Dahl, 1971; Glasius, Kaldor, & Anheier, 2006). We use a detailed index from the annual report by Freedom House to quantitatively reflect the level of freedom of speech and association.[4]

The second variable that we use to consider political institutions is the level of democracy. Many find that the correlation between the level of democracy of the Internet generation and political systems (Milner, 2010), and voting turnout, the level of democracy, and political systems (Norris, 2004, 2011). Such preceding research shows that the level of democracy exerts strong influence on participation. We use data from the Economist Intelligence Unit (EIU) which designs to measure the level of democracy in 160 countries every year.

We set the socio-economic element as a control variable and examine its effect on e-Participation. Socio-economic structures and conditions limit the choices available to a government and its citizens for the adaptation of certain forms of technology (Putnam, 2000; Margolis & Resnick, 2000; Hargittai, 2007). Countries with higher socio-economic resources can offer more access to ICT-generating resources,

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[1] Refer to Hague and Loader (1999), Clift (2004), Bonchek (1998), Norris (2002), and 6 Perri (2004) for further discussion on the concept and scope of e-Participation.

[2] The e-Participation index is derived by converting qualitative assessment into quantitative data. The specific standards of evaluation are based on a 4 point scale system where 0 = never, 1 = sometimes, 2 = frequently, 3 = mostly, and 4 = always. Because this index is derived by reappraising measurement values to minimize error, it is widely regarded as authoritative and accurate.

[3] Powell (1980) set and defined 3 independent variables in the context of a socio-economic, environment, and institutional setting. The effect of these variables, taken from the constitution and political parties of 29 democratic countries, on the dependent variable voter turnout were analyzed and used as the political participation index. The results showed that independent variables do indeed affect political participation.

[4] The AI variable for the right to freedom of speech and association is a dummy variable, consisting of either a yes or no input. Refer to Glasius, Kaldor, and Anheier (2006) for further details.

Table 1
Measured variables and their source.

Variable	Indicator		Source
Technology	① Percentage of individuals using the Internet[a]		ITU (2012)
Political institutions	① Political rights and civil liberties.	– Institutionalization of the freedom of speech and association	Freedom House (2012)
	② The level of democracy	– Different of the level of democracy	EIU (2012)
Socio-economy (control variable)	① Human Development Index (HDI)	– Rate of illiteracy, indicators on education and income	UNDP (2013)
Participation	Level of e-Participation	– UN e-Participation indicator	UN (2012)

[a] Online population was divided into two groups (above average/below average).

hence offering more opportunities for a citizen to participate in public issues (DiMaggio, Hargittai, Neuman, & Robinson, 2001; Best & Krueger, 2005; Min, 2010; Albrecht, 2006). Studies have shown that low illiteracy, high economic power, and low population all increase offline voting turn-out (Powell, 1982: 37; Blais & Dobrzynska, 1998). We use the 'Human Development Index (HDI),' which was developed by the UNDP (2013). The HDI reflects all of the complicated elements of the socio-economic aspect, as it is determined by investigating diverse conditions related to the human life of each country such as the actual national income, level of education, rate of illiteracy, and average citizen lifespan (UNDP, 2013).

Multiple regressions, t-test, three-way ANOVA analyses of 125 countries are used to verify the causality between the variables and e-Participation. We look closely at e-Participation by using variables on political institutions and technology with the ultimate intention of determining which variables affect e-Participation through a comprehensive analysis. In addition, to determine the degree to which institutions and technology affect the interaction between variables, countries with high levels of e-Participation are grouped and compared with those of low e-Participation countries. SPSS software version 19.0 was used for all analyses.

4. Analysis

4.1. Online vs. offline participation

We investigate the relationship between e-Participation and offline participation. Several studies have claimed that a connection exists between e-Participation and offline participation, and strengthening e-Participation increases offline participation over the long-term (6 Perri, 2004; Clift, 2004; Bonchek, 1998: 76; OECD, 2003). Interestingly enough, however, the results of our study contradict these findings. Of the 125 countries analyzed, the coefficient of correlation between recent voting turn-out and the UN e-Participation index is a meager 0.079, which is not statistically significant, and thus, there is not much correlation between e-Participation and offline participation. This

finding implies that a high level of e-Participation does not necessarily guarantee a high level of offline civil participation. In other words, the use of ICT has not directly enhanced representation in offline civil participation.

4.2. e-Participation, institution, and technology

Table 2 presents summary statistics, showing the means, standard deviations, and correlations of the variables in this study. Model A is the result of an analysis of the relationship between the level of ICT and e-Participation, showing the level of ICT is a crucial variable in determining the level of e-Participation ($p < 0.001$); the value of β is 0.477. This result indicates that ICT does indeed affect e-Participation confirming causality between building ICT infrastructure and civil participation (Bimber, 2008; Salter, 2004; Lunat, 2008).

One must examine this result more carefully by ruling out other possible variables before claiming that e-Participation is determined by a single technology variable. Model B is based on a multiple regression analysis of e-Participation and political institutional variables. This model is viable as it has an R^2 value of 0.095 and a statistically significant regression equation (F = 7.504, $p < 0.01$). This indicates that there is a causal relationship between e-Participation and the level of democracy ($p < 0.001$), although the other political institution sub-variable (the right to freedom of speech and association) is rejected.

Model C identifies the relationship between the socio-economic variable and e-Participation. While the adjusted R^2 is 0.191, the value of F is statistically significant ($p < 0.001$). This indicates that there is a relationship between e-Participation and HDI ($p < 0.001$). That is, higher levels of education and economic development are associated with more active e-Participation (Min, 2010; Jackman, 1987: 405–423; DiMaggio et al., 2001).

Model D uses political institutions and technology as variables and had an R^2 value of 0.331. Statistically significant variables from the model are technology ($p < 0.001$). As expected, the ICT variable has a high level of significance ($p < 0.01$). Specifically, the level of e-Participation is higher in countries that possess advanced technology.

Table 2
e-Participation regression model summary.

	Model A			Model B			Model C			Model D		
	B	β	p	B	β	p	B	β	p	B	β	p
Constant	0.671		***	1.074		***	−0.929			0.970		***
Technology												
Online population	0.458	0.477	***							0.007	0.387	**
Political institutions												
Level of institutionalization of freedom of speech and association				−0.137	−0.134					−0.144	−0.141	
Level of democracy				0.229	0.380	***				0.125	0.220	
Socio-economic variable												
HDI							3.037	0.450	***			
F	36.298 (***)			7.504 (**)			16.797 (***)			16.324 (***)		
Adjusted R^2	0.477			0.095			0.191			0.331		

Dependent variable: e-Participation.
  * p < 0.05.
  ** p < 0.01.
*** p < 0.001.

Thus, a high level of ICT implies a larger e-population as well as a new channel for e-Participation. Specifically, the impact of ICT is 38.7%. But the political institution variables are rejected. This implies that, in model D which respectively checked the effects of technology and institutions on e-Participation, only technology is positively related to e-Participation..

The regression analysis shows that the level of technology and political institutionalization are the variables that determine e-Participation. Hypothesis 1 states that higher technology increases e-Participation. In models A and D, the technology variable (online population) is confirmed as an important variable affecting e-Participation ($p < 0.001$). Analysis of these models confirms that there is a positive relationship between technology (online population) and e-Participation, as expected. Hypothesis 2 asserts that a stronger level of democracy increases e-Participation. In model B of Table 2, the level of democracy shows a positive direction in e-Participation ($p < 0.001$). The outcomes support both Hypotheses 1 and 2.

4.3. Interaction effects of technology and political institutions

Then, does this result mean that the presence of a larger online population in a country will show higher e-Participation? We divide samples into two groups (a group of countries with a high e-Participation indicator and that with a low indicator) and compare e-Participation among two groups according to the e-Participation index average conducting t-test. We compare e-Participation of the two groups in order to examine whether differences in political institutions, HDI, and technology exist.

Table 3 verifies that the level of technology with socio-economics and political institutions affect e-Participation between two groups. From t-test verification, we find that the country group with a high level of e-Participation has a high HDI ($p < 0.001$), a large online population ($p < 0.001$), a high level of institutionalization of freedom of speech and association ($p < 0.01$), and a high level of democracy ($p < 0.001$). It means that a high level of e-Participation is associated with not only technological infrastructure but also the political institutions such as freedom of speech and association and the level of democracy. We find that countries with high ICT and high democratic institutionalization levels, for example, UK, Australia, US, and France, where freedom of online activity is guaranteed through technological infrastructure and various democratic institutions, show high e-Participation. On the other hand, the countries having low technology and low political institutionalization show low e-Participation. These countries include Angola, Bangladesh, Egypt, El Salvador, Nicaragua, Pakistan, and Panama.

In the examination of the effects of technology and political institutions on e-Participation, we understand that technology and political institutions exhibit certain influences. We conduct a three-way

ANOVA (analysis of variance) test to compare e-Participation between the countries of the clusters according to technology and political institutions. For the ANOVA test, we transform the independent variables categorically. We begin by breaking the online population into two groups (high and low; above and below average), and then arbitrarily assign a score of "1" for a low level online population and "2" for a high level online population. The political institution is recoded as a dummy variable. First, the freedom of speech and association was divided into No ($= 1$) and Yes ($= 2$). Second, about the level of democracy, according to the EIU's criteria, the paper divided democratic countries with 3 from non-democratic countries with 1 in order. While regression analysis is to find the variables that affect e-Participation, the ANOVA test finds how such variables affect e-Participation. If a variable singularly influences e-Participation, this will be regarded as having a certain relationship with e-Participation without other mediating factors. If e-Participation is different at a statistically significant level through the ANOVA test, the results will support the influence of ICT and institutionalization on the distinct e-Participation between the clusters (Table 4).

Hypothesis 3 suggests that technology will positively moderate the influence of institutions on e-Participation, especially when technology is high. The results show that in e-Participation, technology plays roles as a crucial variable ($p < 0.05$), while the two variables of the political institutions were rejected statistically. At a glance, this result may be interpreted in a way that technology is the only variable influencing e-Participation. However, the ANOVA result analyzing the interaction effect between the political institutions and technology shows that the technology and democracy levels have a correlation with e-Participation ($p < 0.01$). We also find that interaction between the two variables of the political institutions and technology is statistically significant ($p < 0.001$), supporting Hypothesis 3. It means that no other variables than technology influence e-Participation as a single variable, but when the two variables of technology and the political institutions are interacting with each other, they influence e-Participation.

The ANOVA result implies that the level of ICT, the freedom of speech and association, and the level of democracy which are the statistically significant variables from our regression analysis can be enhanced in the presence of one another. Online population, the explanatory variable of ICT, will together with the consolidation of democracy and freedom of speech and association create complementary effects on e-Participation. The complementary effect means when the variables (level of ICT and political institutionalization) that affect the outcome (e-Participation) interact, they create a greater impact than when they act unilaterally. Until now, policy-makers and administrations have been preoccupied with establishing the right platform to encourage e-Participation. But the ANOVA result shows that such platforms which are acting in conjunction with developments of democratic institutions can enhance intended e-Participation for democracy.

Table 3
e-Participation, socio-economic, political institutions, and technology.

Variable		Classification	Mean	t-Test	
				t	p-Value
e-Participation	Online population	Low e-Participation level (N = 80)	33.7937	− 7.646	0.000 (***)
		High e-Participation level (N = 45)	67.1275		
	Level of institutionalization of freedom of speech and association	Low e-Participation level (N = 80)	2.2593	− 3.150	0.002 (**)
		High e-Participation level (N = 45)	2.6818		
	Level of democracy	Low e-Participation level (N = 80)	2.0625	− 3.623	0.000 (***)
		High e-Participation level (N = 45)	2.5778		
	HDI	Low e-Participation level (N = 80)	1.4938	− 7.169	0.000 (***)
		High e-Participation level (N = 45)	2.4545		

5-point scale: 1 = No Experience.
 * $p < 0.05$.
 ** $p < 0.01$.
*** $p < 0.001$.

Table 4
Three-way ANOVA analysis on the interaction effects between political institutions and technology.

Sources	Type III SS	df	Mean square (MS)	F	p
Model	12.461	11	1.133[a]	7.836	0.000 ([***])
Online population	0.871	1	0.871	6.024	0.016 ([*])
Freedom of speech and association	0.341	1	0.341	2.360	0.127
Level of democracy	0.621	3	0.207	1.432	0.237
Online population * freedom of speech and association	0.236	1	0.236	1.631	0.204
Online population * level of democracy	1.418	2	0.708	4.893	0.009 ([**])
Freedom of speech and association * level of democracy	0.387	2	0.193	1.337	0.267
Online Population * freedom of speech and association * level of democracy	4.218	1	4.218	29.171	0.000 ([***])
Total	260.000	125			

[a] Adjusted $R^2 = 0.377$.
[*] $p < 0.05$.
[**] $p < 0.01$.
[***] $p < 0.001$.

5. Discussion and conclusion

5.1. Discussion

From regression analysis, we show that the factors affecting e-Participation have strong causality with the level of ICT, level of institutionalization of freedom of speech and association and democracy in political institutions. We confirm that the different effects of technology and the political institutions on e-Participation between high or low e-Participation countries. From the three-way ANOVA test, we find that both the technological factor and the political institutions have interactive effects showing that the political institutions enhance the level of e-Participation when combined with technological competencies.

First, one thing to note is the significance of the technology variable (online population) for increasing civil e-Participation. We find high causality of e-Participation with the technological variable in models (A and D). This confirms much literature that regards the development of ICT as a mechanism for expanding or diversifying the range and level of civil e-Participation (Mossberger, Tolbert, & McNeal, 2008; Boulianne, 2009; Milner, 2010). Many influences of the development of ICT can be observed in the ousting of Estrada, the former president of the Philippines, the demonstrations in Great Britain over oil price hikes (Rheingold, 2002), and the 'Facebook effect' on Arab democratic movements in 2011, where technology has been used as channel for expressing the diverse interests and desires of the people.

Second, we find that the country group with a high level of e-Participation has a high HDI ($p < 0.001$), a large online population ($p < 0.001$), a high level of institutionalization of freedom of speech and association ($p < 0.01$), and a high level of democracy ($p < 0.001$), from t-test verification. The result shows that the variable affecting e-Participation has strong causality with HDI, online population level, level of institutionalization of freedom of speech and association, and the level of democracy variables in the political institutions.

Third, the three-way ANOVA is used to verify the effects of interactions of technology and institutions on e-Participation. The result shows that the technology and democracy levels have interaction with e-Participation ($p < 0.01$). And interaction between the two variables of the political institutions and technology is statistically significant ($p < 0.001$).

Although there are some discrepancies among selected variables for regression, t-test and three-way ANOVA, the most important finding of this study is the close association between political institutions and technology for e-Participation. We verify that the democratic potential for participation is dependent on institutions and the institutional capacity of the government in question (Coleman, 1990; Powell, 1982; Jackman, 1987; Chadwick, 2006; Åström et al., 2012). These results mean that to achieve full-fledged citizen e-Participation, governments should eliminate socioeconomic and institutional constraints which are layered in a country. Since e-Participation is dependent on the political institutions such as the freedom of speech and association and level of democracy, and the level of the online population, e-Participation cannot be restricted to building an ICT network. That is, efficient implementation of e-Government is not simply upgrading interfaces for e-Participation or expanding spaces for citizen participation, but stimulating e-Participation by considering the enhancement of ICT competencies of users and the political institutionalization of democracy.

5.2. Implications and recommendations

This research provides implications to many countries, which try to stimulate civil participation through the implementation of e-Government or a technological infrastructure. In the last years, the use of ICT has been considered as a way of reforming inefficient and corrupt governments, and changing authoritative governments by promoting political and social participation of citizens in public affairs. Indeed, many governments tried to create and operate their own computerized systems and to digitalize front and back offices for managerial effectiveness of public administration. New communication devices and networks were considered to increase the transparency, efficiency, and legitimacy of the public process and decision-making. Hence, many ways of increasing e-Participation such as online chatting and consultation has received increased attention as the development of ICT opens up new opportunities for two-way and cheap communication. For example, online chatting and online posting have been considered as a potential method for increasing political participation and redirecting citizens more directly into the policy processes. Increased participation in political and social issues using an ICT infrastructure may increase access for citizens, politicians, and other stakeholders to promote their interests and preferences in the process of public agenda setting and policy-making.

Although the purpose of technology-facilitated arrangements, i.e. e-Government, is to increase citizen access to the political process and to support citizen deliberation on public issues, it is questionable to what extent those activities can really increase the opportunities of citizens in the policy and decision-making process. Our research results show that the promotion of democratic governance using ICT involves mediating relationships between institutional spheres of governance with ICT. e-Participation is not only related to the use of ICT in the administrative and policy process but also linked to many existing relationships such as between the government and citizens, inter-governmental relations, and complex political environment. That is, the way that technology helps to promote e-Participation also depends on political institutional and social context which varies between governments and societies.

First, a major challenge is how to connect growing online participation to formal and institutional channels of inclusion in governments' efforts to include rising civil voices to the political and administrative process. Korea and Taiwan can be examples of a high online activism

and e-Participation rate using well-developed communication networks. With the high development of many forms of communications services, citizens in Korea and Taiwan easily organize online communities and networks, grass-roots movements and protests. Indeed, we have seen many new forms of online activism and participation and online political discourses in these countries. However, many online controversies are held in portal sites and the Twitter network, and confrontations and conflicts are repeated year after year without providing feedback from public officials. A major challenge is, hence, how to connect these increasing discontents and discourse into the political and public process. Promoting democratic governance and e-Participation may require changes and supplementing establishments in traditional institutions and laws in current e-Government initiatives (DiMaggio et al., 2001).

Second, the e-Government platform with which to increase the level of e-Participation must be aligned with each country's institutional arrangement. This research shows that when conditions of ICT are consistent, then the level of e-Participation varies in accordance with institutional frameworks that develop the level of democracy. This means that when democratic institutions for disclosure of public information, citizen's policy suggestions and their reflection into the policy process are equipped with a certain level of e-Government platforms, citizen's participation will be increased for further democratic development in a country. Crozier, Huntington, and Watanuki (1975) argue that stressing the increase of civil participation without having an institutional system has adverse effects bringing democratic crisis rather than democratic development. This is coherent with the UN's recommendation to transitioning democracies which in the 'Technical Cooperation Projects on E-Government' states that digitalization of government and institutionalization of democracies must go hand in hand (UN, 2002).

Third, this research contains the implications of the Open Government Partnership (OGP) initiative in transitional democracies. In 2011, the OGP was established with the purpose of increasing transparency in government, extending rights for citizens, curtailing corruption, and strengthening governance (http://www.opengovpartnership.org/). In order to participate in the OGP, governments must exhibit the minimum criteria in four key areas such as fiscal transparency, access to information, public officials' asset disclosure, and citizen engagement. In particular, it focuses on strengthening political institutionalization for increased citizen access as well as opening up public data and promoting international cooperation. This OGP initiative is in line with the realization of e-Government experts who try to promote democracy in transitional democracies. Once reforms for increasing public data transparency have been institutionalized, citizens' interest in government policies along with e-Participation and the authority of citizens will be further enhanced (Lee & Kwak, 2012). By observing further development of the OGP initiative, this research could further test the argument that we develop in this paper.

Fourth, the outcome of this research implies that the democratic gap between authoritative and democratic governments still remains a problem. In general, an advanced country which has a high level of ICTs and a high institutionalization mechanism contributes to institutionally boost and reflect citizens' participation, and political institutionalization should follow in steps with an increased online population. Yet nations with low levels of democracy could hardly bring themselves to achieve compelling levels of e-Participation even if high levels of ICT are present. In fact, authoritative governments in countries like Russia and China enjoy high levels of ICT and have sound e-Governments but e-Participation of citizens remain slow due to their low level of institutional arrangements.

The research on improving e-Participation is significant in that it describes not only the relationship between e-Participation, technology, and political institutions, but also how technology and institutions interact with respect to e-Participation. The analysis allowed us to determine and quantify the relationship between technology and institutions for e-Participation. This study is important in that it identified causality between e-Participation and technological, socio-economic, and political institution variables, thus expanding our knowledge and understanding of civil participation and democracy.

Acknowledgments

References

6 Perri (2004). *e-Governance: Styles of political judgment in the information age polity.* New York: Palgrave.

Albrecht, S. (2006). Whose voice is heard in online deliberation?: A study of participation and representation in political debates on the internet. *Information, Communication & Society, 9*(1), 62–82.

Arterton, C. (1987). *Teledemocracy: Can technology protect democracy?* Newbury Park: SAGE Publications.

Åström, J., Karlsson, M., Linde, J., & Pirannejad, A. (2012). Understanding the rise of e-participation in non-democracies: Domestic and international factors. *Government Information Quarterly, 29*(2), 142–150.

Balnaves, M., Mayrhoter, D., & Shoesmith, B. (2004). Media professions and the new humanism. *Journal of Media & Cultural Studies, 18*(2), 191–203.

Barber, B. (1998a–99). Three scenarios for the future of technology and strong democracy. Political Science Quarterly, 113(4): 573–589.

Barber, B. (1998b). *A place for us: Hoe to make society civil and democracy strong.* New York: Hill and Wang.

Bennett, S., Maton, K., & Kervin, L. (2008). The 'digital natives' debate: A critical review of the evidence. *British Journal of Educational Technology, 39*(5), 775–786.

Bertot, J. C., Jaeger, P. T., & Grimes, J. M. (2010). Using ICTs to create a culture of transparency: e-Government and social media as openness and anti-corruption tools for societies. *Government Information Quarterly, 27*(3), 264–271.

Best, S. J., & Krueger, B. S. (2005). Analyzing the representativeness of internet political participation. *Political Behavior, 27*(2), 183–216.

Bimber, B. (2008). *Information and American democracy: Technology in the evolution of political power.* Cambridge, MA: Cambridge University Press.

Blais, A., & Carty, K. (1991). The psychological impact of electoral laws: Measuring Duverger's elusive factor. *British Journal of Political Science, 21*(1), 79–93.

Blais, A., & Dobrzynska, A. (1998). Turnout in electoral democracies. *European Journal of Political Research, 33*(2), 239–261.

Bonchek, M. S. (1998). *From broadcast to netcast: The Internet and the flow of political information.* Cambridge, MA: Harvard University Press.

Boulianne, S. (2009). Does internet use affect engagement?: A meta-analysis of research. *Political Communication, 26*(2), 193–211.

Castells, M. (2008). The new public sphere: Global civil society, communication networks, and global governance. *The Annals of the American Academy of Political and Social Science, 616*(1), 78–93.

Chadwick, A. (2001). The electronic face of government in the internet age: Borrowing from Murray Edelman. *Information Communication and Society, 4*(3), 435–457.

Chadwick, A. (2003). Bringing e-democracy back in: Why it matters for future research on e-governance. *Social Science Computer Review, 21*(4), 443–455.

Chadwick, A. (2006). *Internet politics: States, citizens, and new communication technologies.* New York: Oxford University Press.

Clift, L. (2004). *e-Government and democracy: Representation and citizen engagement in the information age.* UNPAN/DESA World Public Sector Report.

Coleman, J. (1990). *Foundations of social theory.* Cambridge, MA: Belknap Press of Harvard University Press.

Coleman, R., Lieber, P., Mendelson, A. L., & Kurpius, D. D. (2008). Public life and the internet: If you build a better website, will citizens become engaged? *New Media & Society, 10*(2), 179–201.

Coleman, S., & Shane, P. M. (2011). *Connecting democracy: Online consultation and the flow of political communication.* Cambridge, MA: The MIT Press.

Crozier, M., Huntington, S., & Watanuki, J. (1975). *The crisis of democracy.* New York: New York University Press.

Cullen, R., & Sommer, L. (2011). Participatory democracy and the value of online community networks: An exploration of online and offline communities engaged in civil society and political activity. *Government Information Quarterly, 28*(2), 148–154.

Dahl, R. (1971). *Polyarchy.* New Haven: Yale University Press.

Davis, R. (1999). *The web of politics: The internet's impact on the American political system.* New York and Oxford: Oxford University Press.

Davis, S., Elin, L., & Reeher, G. (2002). *Click on democracy: The internet's power to change political apathy into civic action.* Boulder: Westview.

Delany, C. (2009). Learning from Obama: Lessons for online communicators in 2009 and beyond. Retrieved from http://www.kstreetcafe.com/learning-from-obama-lessons-for-online-communicators-in-2009-and-beyond.

DiMaggio, P., Hargittai, E., Neuman, W. R., & Robinson, J. P. (2001). Social implications of the internet. *Annual Review of Sociology, 27*, 307–336.

EIU. (2012). Democracy index 2012: Democracy at a standstill. Retrieved from https://portoncv.gov.cv/dhub/porton.por_global.open_file?p_doc_id=1034 (04 January 2014).

Elberse, A., Hale, M. L., & Dutton, W. H. (2000). Guiding voter through the net: The democracy network in a California primary election. In K. L. Hacker, & J. Van Dijk (Eds.), *Digital democracy: Issues of theory and practice* (pp. 130–148). London: SAGE.

Ester, P., & Vinken, H. (2003). Debating civil society: On the fear of civic decline and hope for the internet alternative. *International Sociology, 18*(4), 659–680.

Fountain, Jane, E. (2001). Building the virtual state: Information technology and institutional change. Washington, DC: Brookings Institution.

Fraser, M., & Dutta, S. (2008). *Throwing sheep in the boardroom.* Cornwall, UK: Wiley.

Freedom House. (2012). Freedom in the World 2012. Retrieved from http://www.freedomhouse.org/report/freedom-world/freedom-world-2012#.UudE8NGwe70 (04 January 2014).

Freschi, A. C., Medaglia, R., & Nørbjerg, J. (2009). A tale of six countries: eParticipation research from an administration in the European Union. *Lecture Notes in Computer Science, 5694*, 36–45.

Glasius, M., Kaldor, M., & Anheier, H. (2006). *Global civil society 2005/2006.* London: SAGE Publications.

Hacker, K. L., & van Dijk, J. (Eds.). (2000). *Digital democracy.* London: Sage.

Hague, B. N., & Loader, B. (1999). *Digital democracy: Discourse and decision making in the information age.* New York: Psychology Press.

Hargittai, E. (2007). Whose space? Differences among users and non-users of social network sites. *Journal of Computer-Mediated Communication, 13*(1), 276–297.

Hill, K. A., & Hughes, J. E. (1998). *Cyberpolitics: Citizen activism in the age of the internet.* Boston: Rowman & Littlefield Publishers, Inc.

Hooghe, M., Marien, S., & Quintelier, E. (2010). Inequalities in non-institutionalized forms of political participation: A multi-level analysis of 25 countries. *Political Studies, 58*(1), 187–213.

ITU (2012). Measuring the information society. Retrieved from http://www.itu.int/en/ITU-D/Statistics/Documents/publications/mis2012/MIS2012_without_Annex_4.pdf (03 January 2014).

Jackman, R. (1987). Political institutions and voter turnout in the industrial democracies. *The American Political Science Review, 81*, 405–423.

Jackman, R. W., & Miller, R. A. (1995). Voter turnout in the industrial democracies during the 1980s. *Comparative Political Studies, 27*, 467–492.

Jaeger, P. T. (2005). Deliberative democracy and the conceptual foundations of electronic government. *Government Information Quarterly, 22*(4), 702–719.

Jho, W. (2005). Challenges for e-governance: Protests from civil society on the protection of privacy in e-government in Korea. *International Review of Administrative Sciences, 71*(1), 151–166.

Jho, W. (2009). The transformation of cyberactivism and democratic governance in Korea: The role of technology, civil society, and institutions. *Korea Observer, 40*(2), 337–368.

Katz, R. S. (1997). *Democracy and elections.* Oxford: Oxford University Press.

Lawson-Borders, G., & Kirk, R. (2005). Blogs in campaign communication. *American Behavioral Scientist, 49*(4).

Lee, G., & Kwak, Y. H. (2012). An open government maturity model for social media-based public engagement. *Government Information Quarterly, 29*(4), 492–503.

Lijphart, A. (1994). Democracies: Forms, performance, and constitutional engineering. *European Journal of Political Research, 25*, 1–17.

Lin, F., Fofanah, S. S., & Liang, D. (2011). Assessing citizen adoption of e-government initiatives in Gambia: A validation of the technology acceptance model in information systems success. *Government Information Quarterly, 28*(2), 271–279.

Lunat, Z. (2008). The internet and the public sphere: Evidence from civil society in developing countries. *The Electronic Journal of Information Systems in Developing Countries, 35*(3), 1–12.

Margolis, M., & Resnick, D. (2000). *Politics as usual: The cyberspace "revolution".* Thousand Oaks, CA: Sage.

Milner, H. (2010). *The internet generation.* MA: Tufts University Press.

Min, S. (2010). From the digital divide to the democratic divide: Internet skills, political interest, and the second-level digital divide in political internet use. *Journal of Information Technology & Politics, 7*(1), 22–35.

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

Morris, D. (2000). *Vote.com.* Los Angeles: Renaissance Books.

Mossberger, K., Tolbert, C., & McNeal, R. (2008). *Digital citizenship: The Internet, society, and participation.* Cambridge, MA: MIT Press.

Mundy, D., & Musa, B. (2010). Towards a framework for e-government development in Nigeria. *Electronic Journal of e-Government, 8*(2), 148–161.

Nam, T., Pardo, T. A., & Burke, G. B. (2012). e-Government interoperability: Interaction of policy, management, and technology dimensions. *Social Science Computer Review, 30*(1), 7–23.

Norris, P. (2002). *Democratic phoenix: Reinventing political activism.* Cambridge: Cambridge University Press.

Norris, P. (2004). *Electoral engineering.* Cambridge: Cambridge University Press.

Norris, P. (2011). *Democratic deficit.* Cambridge: Cambridge University Press.

OECD (2003). *Promise and problems of e-democracy.* Paris: OECD.

Painter, A., & Wardle, B. (2001). *Viral politics: Communication in the new media era.* London: Politico's publishing.

Plott, C. R. (1979). The application of laboratory experimental methods to public choice. In C. S. Russel (Ed.), *Collective decision making: Applications from public choice theory* (pp. 137–160). Baltimore, MD: Johns Hopkins University Press.

Powell, B. (1980). Voting turnout in thirty democracies: Partisan, legal and socioeconomic influence. In R. Rose (Ed.), *Electoral participation: A comparative analysis.* London: Sage.

Powell, G. B. (1982). *Contemporary democracies: Participation, stability and violence.* Cambridge: Harvard University Press.

Putnam, R. (2000). *Bowling alone: The collapse and revival of American community.* New York: Simon Schuster.

Quintelier, E., & Vissers, S. (2008). The effect of Internet use on political participation: An analysis of survey results for 16-year-olds in Belgium. *Social Science Computer Review, 26*, 411–427.

Rheingold, H. (2002). *Smart mobs: The next social revolution.* Cambridge: Basic Books.

Rodan, F. (2003). Embracing electronic media but suppressing civil society: Authoritarian consolidation in Singapore. *The Pacific Review, 16*(4), 503–524.

Sæbø, Ø., Rose, J., & Skiftenes Flak, L. (2008). The shape of e-Participation: Characterizing an emerging research area. *Government Information Quarterly, 25*(3), 400–428.

Salter, L. (2004). Structure and forms of use: A contribution to understanding the 'effects' of the internet on deliberative democracy. *Information, Communication & Society, 7*(2), 185–206.

Shirky, C. (2008). *Here comes everybody: The power of organizing without organizations.* New York: Penguin Press.

Siau, K., & Long, Y. (2009). Factors impacting e-government development. *Journal of Information Systems, 50*(1), 98–107.

Sylvester, D. E., & McGlynn, A. J. (2010). The digital divide, political participation, and place. *Social Science Computer Review, 28*(1), 64–74.

Tolbert, C., & McNeal, R. (2003). Unraveling the effects of the Internet on political participation? *Political Research Quarterly, 56*, 175–185.

UN. (2012). e-Government survey 2012: e-Government for the people. Retrieved from http://unpan1.un.org/intradoc/groups/public/documents/un/unpan048065.pdf (03 January 2014).

UN. (2002). Technical cooperation projects on e-government. Retrieved from http://unpan1.un.org/intradoc/groups/public/documents/un/unpan025099.pdf (23 November 2014).

UNDP. (2013). 2013 human development report. Retrieved from http://hdr.undp.org/en/countries (03 January 2014).

Vicente, M. R., & Novo, A. (2014). An empirical analysis of e-participation. The role of social networks and e-government over citizens' online engagement. *Government Information Quarterly, 31*(3), 379–387.

Weber, L., Loumakis, A., & Bergman, J. (2003). Who participates and why?: An analysis of citizens on the Internet and the mass public. *Social Science Computer Review, 21*, 26–42.

Zhenga, Y., Schachterb, H. L., & Hozler, M. (2014). The impact of government form on e-participation: A study of New Jersey municipalities. *Government Information Quarterly, 31*(4), 653–659.

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