Adding Validity and New Results to the Global Explanations of e-Democracy

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Abstract

The use of information and communication technologies (ICTs) in democratic processes, often summarized by the term e-democracy, has seldom been analysed from a global perspective. Although the UN eParticipation index provides one of the few examples of an international measurement of e-democracy, it has been thoroughly criticized. At the same time, however, a number of studies have added knowledge in the field of global determinants of e-democracy by using this very index. In this study I resolve this by: (1) examining whether the UN index is a valid measurement of e-democracy; (2) inquiring whether there are alternative measurements of e-democracy and finally (3) retesting the determinants of e-democracy using the UN index and alternatives together with a larger data set and more suitable estimations than have previously been used in this field. The article gives answer to these questions. First, even if the index has flaws it is not necessarily as problematic as assumed. Second, combining this index with measurements of democracy corresponds with the emphasis in the literature on e-democracy being embedded in democracy. Third, the determinants of e-democracy on a global scale show the positive importance of technology but also of socio-economic variables and population size.

Keywords: e-democracy, democracy, global comparison, comparative method, Information and communication technologies

Notes on contributor

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Introduction

Several of the groundbreaking social scientists of the twentieth century have contributed to increasing our understanding of how the rapid development of information and communication technologies (ICTs) affects politics and, in particular, the complicated system of democracy. Dahl writes (1989, p.339) that: ‘The evolving technology is bound to be used somehow, for good or ill. It can be used to damage democratic values and the democratic process, or it can be used to promote them.’ Scholars such as Castells (2004) and Putnam (2000) are leaning towards accepting the shortcomings of the appliance of ICTs in democracy; they risk making democracy an empty shell as well as assisting in eroding social capital. Although the actual outcome is still unclear, we can be confident that the technology will alter our political institutions in some way (e.g. Wheeler 1998). One of the subfields that is derived from these general standpoints has a focus on the concept of e-democracy, the contraction of electronic democracy with the general meaning of the use of ICTs in democratic processes. Recently, some studies have brought new knowledge to the global explanation of this phenomenon by conducting comprehensive studies of different countries’ success in e-democracy (Åström et al. 2012; Lee et al. 2011; Williams et al. 2013). It is apparent that studies of this type now attract a growing interest from comparative scholars with their specific collections of methods. In relation to these studies, both Åström et al. (2012) and Lee et al. (2011) show how the number of Internet users, democracy or transparency and, as examined by the latter, population positively influence e-democracy. In both these studies the authors derive from the UN’s ‘eParticipation’ index (ePart) as quantification of the dependent variable. Scrutinizing accessible data shows that global indicators of e-democracy are, besides this alternative, mostly absent. The choice of this index is, though, not without problems. Grönlund (2011) stresses the lack of validity in the used measurement, which results in bizarre outcomes such as that cruel autocracies can be ranked as highly strong in e-democracy. Potential flaws of this character call for a discussion of the ePart index and highlight a need to add extra and more rigorous tests to ascertain the global determinants of e-democracy. Three research questions will guide this approach:

• To what extent is the ePart index a valid measurement of e-democracy?
• Are there alternative measurements that better capture the theoretical understanding of e-democracy?
• Using the ePart and alternative measurements of e-democracy, what are the factors explaining e-democracy on a global level?

By answering these questions, the ambition here is to consider measurement validity in this field of research as well as to investigate theoretically founded factors included in the explanation of e-democracy.

The remainder of this article approaches the three research questions in turn, though begins with a review of the literature on definitions of e-democracy. Thereafter the ePart is evaluated and an alternative measurement of e-democracy is discussed before turning to theoretical notions about the explanations of e-democracy. Finally, an extensive data set is applied to analyse the variation in both the ePart index and an alternative measurement. In a concluding section the research questions are answered and theoretical implications are discussed.

Defining e-democracy and ways to measure it

As has frequently been argued, the theoretical underpinnings of e-democracy are vague and imprecise (Hacker & van Dijk 2000; Macintosh et al. 2009; Saebø et al. 2008). Quantifying concepts in the social sciences is, though, dependent on a solid understanding of what they are made up of. In the case of e-democracy, I link up with earlier research and argue that such an understanding should be collected from democratic theory in which e-democracy can be understood as a subordinate concept to
democracy. Regarding specific conceptualization of e-democracy, earlier research is imprecise, but there are some common features among the most established definitions of e-democracy. The perspective that was outlined some years ago and still prevails is a view of e-democracy as the use of ICTs in political processes. More specifically, Vedel (2006) describes how e-democracy is the application of ICTs in three political processes: information, discussion and decision-making. This gives us an idea of a concept that is based on applying specific technological applications in a political system.

The point of departure in this article is based on a relationship between a political system and its virtual variants, and sets the direction for how e-democracy could be analysed (Kamarck & Nye 2002; Macintosh et al. 2009; Norris 2001). In other words, this means that the characteristics of an e-democratic system will be influenced by the political system that surrounds it. A consequence of this position is that an e-democracy can hardly, by itself, be totally democratic if the political system in which it is embedded is not democratic (Lidén 2012). This line of argument has been empirically supported by Hill and Hughes (1999) as well as Ott and Rosser (2000), who state that a connection exists between democratization and either the existence of ICTs or the use of some specific functions that are based on this very technology. More striking is the example of China, now the largest Internet user in the world but in which the traits of the general political systems affect the e-democratic version, meaning that Chinese Internet users are subject to surveillance, censorship and control systems, although apparently China is not a country that is e-democratic (Liang & Lu 2010). Nevertheless, such facts are often ignored in contemporary research at the expense of the value seen in functions of e-democracy.

Deriving from the aforementioned, an instrumental perspective of e-democracy provides the best possibilities both for a comprehensive theoretical understanding and for analytical purposes (cf. Vedel 2006). This is because an e-democratic context and the consequences of this can best be analysed if the concept is divided into different processes and when adding the liberal dimension the following definition is used: e-democracy is constituted from the possibility of the usage of ICT in political processes concerning information, discussion and decision-making and in addition includes those being permeated by political and civil rights that are characterized as democratic.

This definition of e-democracy is strongly consistent with the UN’s repeated way of measuring e-participation, which stresses both the supply of e-democratic functions and the procedural perspective of the phenomenon. The ePart derives from measuring functions on government websites that allow the spreading of information and citizen involvement through consultation and decision-making (United Nations 2003; United Nations 2004; United Nations 2005; United Nations 2008; United Nations 2010). Qualitative judgments of these dimensions are applied through a battery of questions, for example: does the political information distributed allow involvement in decision-making, are applications allowing two-way communications provided and can input from citizens through these channels actually influence the decision-making? Countries are then graded on the fulfilment of each of these questions covering the three dimensions, and then the overall judgment is normalized in the interval of 0.0 to 1.0.

In criticizing the ePart index, Grönlund (2011) especially argues that appropriate measurements must prove consistency to ways of measure democracy. Analogous with the discussion above, this argument sets high standards for the operationalization of e-democracy. However, in his study Grönlund finds no relation between the ePart and applied indexes of democracy. If that were the case it would clearly violate the theoretical assumptions of e-democracy and hence highlight this index as having a low level of measurement validity (cf. Adcock & Collier 2001). Three circumstances, however, lower confidence in Grönlund’s result. First, the used data are limited, reflecting only a cross-sectional situation. Second, none of the indexes of democracy that are used are the one that is more established in political science. Third, statistical tests are not systematically used to analyse the
Retesting these findings with particularly concern to strengthen these drawbacks therefore seems to be appropriate and brings us to the first question.

**The performance of the UN eParticipation index**

The accuracy in ePart as a valid operationalization of e-democracy is examined by inquiring into the general assumption of the concept, namely that e-democracy must be embedded in democracy. Some clues are given about its accuracy by correlating the ePart index with the two most prominent indexes of democracy and also a combining measurement of these two. Despite facing some criticism, the chosen indexes are valued due to validity and scope (Munck & Verkuilen 2002; Hadenius & Teorell 2004; Bollen & Paxton 2000) on the condition that a liberal perspective of democracy is assumed (Diamond 1992). In Table 1 the following three measurements are tested against ePart: (i) the average value of Freedom House’s indicators of civil liberties and political rights, ranging from 1 (high democracy) to 7 (low democracy), (ii) combined scores from Polity IV, ranging from -10 (low democracy) to 10 (high democracy), (iii) the average between Freedom House’s two indexes and Polity (FHP) with imputed data for countries from which data is missing, ranging from 0.0 (low democracy) to 1.0 (high democracy). Data are from the used data set, covering the years 2003, 2004, 2005, 2008 and 2010, in accordance with when the UN index was carried out.

Contrary to Grönlund’s findings, significant correlations are noticed between the ePart and the three variants of the indexes of democracy. The last measurement, FHP, which according to earlier literature performs best (Hadenius & Teorell 2004), is related to the index of e-democracy with a certainty of 99.9%.

<table>
<thead>
<tr>
<th>UN eParticipation index</th>
<th>Combined Freedom House</th>
<th>Combined Polity IV</th>
<th>Combined Freedom House and Imputed Polity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-0.399***</td>
<td>0.298***</td>
<td>0.388***</td>
</tr>
<tr>
<td></td>
<td>N= 761</td>
<td>N=638</td>
<td>N=927</td>
</tr>
</tbody>
</table>

Note: *Significant at the 0.10-level, ** Significant at the 0.05-level, ***Significant at the 0.01-level.

Grönlund’s objection could, though, still be true. It should not be possible for a country to score highly for e-democracy without being democratic. By deriving from the threshold of democracy in the combined FHP index (Hadenius et al. 2012) a closer examination can be made. In Figure 1 two scatter diagrams are presented of countries’ scores on ePart and the level of democracy: the figure on the left only includes non-democracies with a FHP-value lower than 0.75 and the figure on the right, correspondingly, only includes democracies. When interpreting these diagrams, several points can be made. First, a few countries score highly on ePart (above 0.6) without being democratic. There are, though, only three countries (representing six country-years) in the scatter that do so. In general, non-democracies are not especially e-democratic. Second, democracies can score anything from low in ePart to reaching the highest level. Third, in accordance with the assumptions of e-democracy

1. The imputed version has imputed values for countries for which data on Polity is missing. This is done by regressing Polity on the average Freedom House measure. See Hadenius and Teorell (2004). The index has been scaled down from 0–10 to 0.1–1.0 to allow better comparison with the UN index of e-participation.

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founded on the principles of democracy, the relationship between the two entities is not significant in terms of the highest standards in the group of non-democracies but is significant for the group of democracies. That is, a higher level of democracy indicates a stronger ePart and vice versa.

Figur 1 Scatter diagram of the link between eParticipation index and FHP, 2003–2010, non-democracies only (left), democracies only (right)

The ePart index does not, with a few exceptions, violate the assumptions of e-democracy as a phenomenon embedded in democracy. These exceptions should, though, be taken seriously. Although the correlation between democracy and e-democracy is robust, it is not complete. This means that explanations of e-democracy are not solely based on democracy or determinants of democracy. Deriving from these two circumstances I continue with a discussion of the second research question, that is, what is the potential for improving the measurement of e-democracy?

Alternative methods for measuring e-democracy

The previous findings have included some criticism of the ePart index, and the fact that a few observations violate the assumption about e-democratic countries also being democracies makes it necessary to suggest alternative approaches. Since the previously presented definitions of e-democracy underline the importance of such political processes being characterized by democratic political and civil rights, it seems reasonable to ensure that a valid index of e-democracy in some way considers the level of democracy. To correct for this and also to truly let the theoretical foundations of e-democracy be mirrored in the quantification of the concept, a measurement is constructed that derives from both the ePart and the index of democracy. This measurement is constructed simply by multiplying the ePart index with FHP and thereby stating that both these two dimensions are essential for e-democracy. In other words, a high level of ePart cannot compensate for a country being undemocratic, or vice versa. This creates an e-democratic index with the possibility ranging from 0.0 to 1.0.

In Table 2 some basic descriptive data are provided for the ePart and the FHP as well as for the constructed measurement, from now on denoted as e-democracy, for the years 2003–2005, 2008 and 2010. On the basis of the data in the table, it is quite clear that countries in general have lower levels of ePart than the applied measurement of democracy. If this is due to technical issues associated with the construction of the indices, the ePart is normalized when summed up, or actual variation is hard to

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3. For non-democracies: 0.103 p=0.027. For democracies: 0.319 p=0.000.
answer. It should be stated, though, that as many as 159 country-years receive a value of zero for the ePart, while the corresponding figure for FHP is two. Hence, it seems to follow that if that if the ePart is skewed to the left, democratic indexes are currently skewed to the right. Because of the third wave of democratisation the proportion of democracies in the world is larger than before (Huntington 1991; Przeworski et al. 2000; Teorell 2010). In relation to e-democracy, the measurement makes it impossible for any country that scores low on either ePart or FHP to receive a higher value. All in all, a considerable variation in e-democracy is revealed in the index, and the third and final research question can now be addressed.

Table 2 Descriptive statistics for dependent variables

<table>
<thead>
<tr>
<th></th>
<th>ePart</th>
<th>FHP</th>
<th>e-democracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>0.165</td>
<td>0.653</td>
<td>0.137</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>0.215</td>
<td>0.314</td>
<td>0.206</td>
</tr>
<tr>
<td>Min–Max</td>
<td>0–1</td>
<td>0–1</td>
<td>0–1</td>
</tr>
<tr>
<td>N</td>
<td>958</td>
<td>927</td>
<td>927</td>
</tr>
</tbody>
</table>

Theoretical inventory of explanations of e-democracy

There is little systematization of explanations of e-democracy on the level of nation states. Among the exception of studies that have, in a more comprehensive way, explained the variation in countries’ e-democracy, Norris’s contribution (2001) is crucial. Norris identifies three broader categories of theories that can contribute to the understanding of e-democracy, and these have relevant theoretical backgrounds from both democratic and technological theory. Development theories have an economic focus and state that structural changes in societies’ economies result in social and political changes. Bell’s (1973) paradigmatic description of the emergence of a post-industrial society is intimately related to the information technology that today’s knowledge economies are dependent on. The characteristics of a post-industrial society can be crucial as factors that explain e-democracy. More specifically, an advanced and knowledge-based economy, driven by a well-educated workforce, especially when it comes to computing and Internet skills, is said to be a determinant of e-democracy. From the viewpoint of technical determinism, an alternative explanation is presented. Clearly, e-democracy is dependent on the right technological conditions, but whether isolated societal or technological factors are the most important determinants is an empirical question. Advocates of this theory (Smith & Marx 1994; Ellul 1990) argue that technologies per se change society more than society changes technology. In this way, technological theories state that the technological infrastructure is the single most important factor for e-democracy, irrespective of the existence of a knowledge economy and socio-economic development. Finally, Norris discusses theories of democratization as an alternative way of assessing e-democracy. Claiming that virtual politics will mirror the traditional political system, she reveals how the use of democracy can be seen as a factor explaining e-democracy but also, more indirectly, how the use of the extensive alternative theories that explain democracy can be seen. More concretely, this in particular involves the features of the well-known modernization theory as a core explanation of democracy (Lipset 1959; Diamond 1992).

More recently, empirically driven research has examined the accuracy of these theories. As previously noted, Lee et al. (2011) and Åström et al. (2012) have proven that technology, measured through the share of Internet users, seems to have a significant effect on e-democracy. This is a finding that is consistent with how van der Graft and Svensson (2006) have shown how technology, through a developed e-government service production, influences the level of e-democracy. Another study (Medaglia 2007) that is carried out on the local level notes that development, and especially socio-
economic development, is positively related to e-democracy. Moreover, democratic factors have gained importance in these types of studies, indicating that the level of democracy could also influence the outcome of e-democracy. In the same vein, studies have noted a positive effect of globalization on e-democracy as well as a negative relationship on voter turnout and e-democracy, indicating that e-democratic functions draw attention away from traditional form of participation (Åström et al. 2012; van der Graft & Svensson 2006). Although it is not elaborated on by Norris, another important factor is that of size. The studies that include the size of the population in models unanimously report that larger societies in general are more e-democratic than smaller ones (Medaglia 2007; Wohlers 2009; Lee et al. 2011). As discussed in the literature (Viborg Andersen et al. 2007), this could be due to the varying economic preconditions between small and large societies. These different factors will now be evaluated as valid explanations of both the ePart and the e-democracy index.

**Data and analytical techniques**

Addressing the variation in the two dependent variables, ePart and e-democracy, will be done through a set of independent variables that are derived from previous theoretical discussions. In order to estimate the explanatory power of development theory, three usually powerful proxies are applied. First, an indicator of GDP/capita is used as a self-evident way of measuring development. In order to include an additional control for the socio-economic dimensions, a measurement of the neonatal mortality rate is included together with a measurement of the level of average years of female education. Norris (2001) also specifies the importance of technological conditions. This operationalization is quite straightforward and follows earlier research by applying a measurement of the share of Internet users in countries. In line with the proposed arguments, democracy and e-democracy can be assumed to go hand in hand. Therefore seems contradictory to apply democratic theories as explanations of e-democracy. However, in explaining ePart and to maintain consistency with earlier research, the same indicator (FHP) that constitutes half of the e-democratic measurement will be used. This variable cannot be used as a determinant for approaching e-democracy, though. Hence, a theoretically closely related indicator is applied concerning the level of globalization, partly because of its ability to generate significant effects in earlier models (cf. Åström et al. 2012). Finally, population size is added as a control variable because of its strong influence in several earlier studies.

The data set is compiled from several sources, including the UN, the Quality of Government Institute, The Authoritarian Regimes Dataset, the World Bank and the KOF Index of Globalization. The used data is multidimensional, meaning that it is characterized by both a spatial and a temporal dynamic and measures of the used variables are collected repeatedly through time (Finkel 1995). The data set ultimately spans the years 2002–2010 for the 192 countries of the world, but variation exists due to both when the ePart was conducted and because of missing data. Working with such data, often denominated as time-series cross-section (TSCS), I follow the convincing arguments laid out by Beck and Katz and use ordinary least squares (OLS) estimations combined with robust standard errors that correct for problems with heteroscedasticity (Beck & Katz 1995; Beck & Katz 1996). Besides this general approach, I will add precision, in comparison with previous research, by ensuring that no violations occur of assumptions about the normal distribution of the dependent variable when working with OLS, since it can clearly affect the accuracy of models (cf. Freedman 2009). I conclude by estimating the TSCS data with panel-corrected standard errors together with a lagged version of the dependent variable for increasing robustness. This approach minimizes potential problems of heteroscedasticity as well as autocorrelation and is a very strict test of the data.

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4. The correlation between female and male is almost total (0.9677).
5. See Appendix A for a list of all the variables including references.
Findings

The analyses are presented in turn, beginning with ePart as a dependent variable, then turning to the e-democracy index. Regarding the testing of the ePart, previous estimations show different approaches.\(^6\)

I conduct different models for increased comparability, see Table 3. Model 1 presents the approach used in earlier research where the index is tested against three sets of theory as well as control variables. The findings are quite consistent with earlier research, meaning that both the level of democracy and the importance of technology influence ePart. Development factors such as GDP also indicate a weak but significant influence. In addition, control variables, population size and level of globalization are also shown to be important report importance. In order that the assumptions of an OLS regression model are not violated and that the findings of Lee et al. (2011) can be retested, the dependent variable is transformed through the square root of it, and hence a more normally distributed variable is reached (Gelman & Hill 2007). This more robust analysis, presented in Model 2, is much more similar to the first model. The only noteworthy outcome is a strengthened effect of GDP, indicating the importance of development theory. Compared to the findings of Lee and colleagues (2011), this model resembles their analysis on several points, reporting the importance of technology, population and democracy. Except for reaching more strongly significant results for all these variables, Model 2 also stresses the importance of economic development, which was not reported in earlier research.

Additional measures can, however, be taken to increase the certainty of the results. The dynamic in the used data often causes specific problems with autocorrelation and heteroscedasticity. To further increase the robustness of the estimations, such potential bias is controlled for in an additional model by adding lagged values of the dependent variable as well as applying panel-corrected standard errors (see Model 3).\(^7\) Even though the number of observations dramatically decreases due to the yearly unbalance in the panel, the inclusion of the lagged dependent variable can work as a proxy for other potential determinants that are not included and would be hard to include in the model. Turning to the findings, some significant differences are reported compared to previous estimations. As GDP loses its importance, another operationalization of development theory, namely the measurement of females’ level of education simultaneously shows importance. Even though the effect is quite small, it is also significant when controlling for the lag of the dependent variable. Moreover, level of democracy loses its importance as does the globalization index. To conclude, positive relationships with the share of Internet users as well as population are consistently reported as the most important determinant of the ePart.

As has been argued, there are some potential flaws of the ePart that make it reasonable to apply an alternative dependent variable, the constructed index of e-democracy. In Model 4 this index is regressed on the different theories of explanations, although this excludes the democracy index since it is a component of the dependent variable. The result is in many ways similar to explanations of the ePart, meaning that technology and population are crucial determinants. Regarding the variables used for measuring the level of development, some changes are noted in which the mortality rate and the level of education show importance. However, this model suffers from the same errors as previously reported in the ePart, meaning that the dependent variable is not normally distributed. A

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6. Lee et al., in (2011) transform the variable to its square root for not violating assumptions of normality, while Åström et al. in (2012) do not raise any such concerns. Applying both Shapiro-Wilk and sktest to the data set does indicate that the ePart is not normally distributed. Transformations of the dependent variable can at least partly correct this.

7. A Lagrange Multiplier test is conducted to ensure no autocorrelation.

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transformation of the dependent variable is therefore necessary, and in Model 5 this is done in the same fashion as for the ePart index. The changes, compared to the previous model, are minor, mainly consisting of the fact that mortality rate loses its ability to explain the variation in the dependent variable.

To correct for possible problems I apply the same type of estimations that are used for the ePart index in Model 3, which means adding control for both autocorrelation and heteroscedasticity. The findings in Model 6 highlight that there are three different types of explanations that influence the level of e-democracy. Development is important and, in this case, level of education reports significant, although not especially strong, results. Furthermore, technology clearly influences the level of e-democracy in a positive way. Finally, population size actually matters in all these estimations, making it hard to doubt the crucial determining effect of the variable.
Table 3 Time-series cross-sectional regressions for e-democracy scores

<table>
<thead>
<tr>
<th></th>
<th>Dependent variable: ePart index in (1), in (2) &amp; (3) a square root transformation</th>
<th>Dependent variable: e-democracy index in (4), in (5) &amp; (6) a square root transformation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1) (2) (3)</td>
<td>(4) (5) (6)</td>
</tr>
<tr>
<td><strong>Development theory</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GDP/cap (log)</td>
<td>.0271548 (.0155964)*</td>
<td>-.0167255 (.0140723)</td>
</tr>
<tr>
<td>Neonatal mortality rate</td>
<td>-.0002367 (.0005612)</td>
<td>.0011292 (.0005236)**</td>
</tr>
<tr>
<td>Average years of female education</td>
<td>.0024707 (.0022919)</td>
<td>.0096146 (.0019842)**</td>
</tr>
<tr>
<td><strong>Technology theory</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internet users (per 100 people)</td>
<td>.0052014 (.0004889)**</td>
<td>.0054083 (.0004761)**</td>
</tr>
<tr>
<td><strong>Democratic theory</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Democracy index (FH/Polity Imputed)</td>
<td>.1006129 (.0206332)**</td>
<td>.0187746 (.049057)</td>
</tr>
<tr>
<td><strong>Control variables</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Population (log)</td>
<td>.0850615 (.0082514)**</td>
<td>.059193 (.007966)**</td>
</tr>
<tr>
<td>Globalization index</td>
<td>.0001771 (.0007083)**</td>
<td>.0017438 (.0006035)**</td>
</tr>
<tr>
<td>Lag of dependent variable (t-1)</td>
<td>.6814489 (.2154464)**</td>
<td>.7620088 (.1434003)**</td>
</tr>
<tr>
<td>N</td>
<td>827</td>
<td>827</td>
</tr>
<tr>
<td>R-squared</td>
<td>.5975</td>
<td>.6316</td>
</tr>
</tbody>
</table>

Note: Entries are coefficients followed by robust standard errors. All independent variables are lagged one year. Multicollinearity is controlled for, not allowing a VIF larger than 6.0. *Significant at the 0.10-level, ** Significant at the 0.05-level, ***Significant at the 0.01-level.
Conclusions

There is no doubt that ICTs have influenced and will continue to influence political systems around the globe. The directions of such changes are, though, to a large extent shrouded in mystery. The understanding of countries’ varying success of applying such technologies in e-democratic processes is to a similar degree undeveloped. This means that there are no common grounds for either operationalizing the phenomenon of e-democracy or a coherent model of explanation of the concept. This article has tried to add consistency to this debate in three ways.

First, the ePart has been evaluated on the basis of a crucial assumption, namely that democracy is a prerequisite for e-democracy. It has been revealed that the index is not fully able to reach such an assumption. Grönlund’s criticism is therefore justified, even if it is slightly exaggerated, because there are only a few observations that oppose this assumption. Contrary to Grönlund’s (2011, p.36) findings, significant correlations are found between ePart and the established indices of democracy. Hence, one can really reflect upon the accuracy of Grönlund’s formulation of ‘the dangerous tool’ in relation to the index.

Second, the alternative measurement of e-democracy is, through its construction, more valid than the ePart. This is because of how the method for quantifying the theoretically elaborated concept of e-democracy adheres to crucial demands of measurement validity by taking fundamental political and civil rights into account.

Third, the analysis of both the ePart and the e-democracy index brings new knowledge to the field, and the findings are important in several ways. Before turning to the contents of the models, it should be noted that they must be judged to adhere to the ambitions of parsimony through reaching leverage in explanatory power through few different factors. In comparison with previous research, the total explanatory power is also higher and in the range of 60% to 65% for both the dependent variables. The most rigorous tests of ePart and e-democracy reveal empirical proofs that are in line with the development of societies and their political systems, as stated by Lipset (1959) as early as the 1950s. More concretely, the results stress that it is not the development per se that increases the possibilities for levels of democracy or, in this case, e-democracy, but the effects of an increasing development. Most obviously, levels of education and not direct economic effects influence the dependent variables. This is in accordance with the causal mechanisms that are sketched out by Diamond (1992), which state that strengths in the area of education can change the political culture and be an advantage for democracy. Likewise, studies from a digital microperspective report the importance of education for citizens to take part in e-democratic activities (Min 2010; Nam 2011). Moreover, the level of technology seems to be a central component in the explanation of e-democracy. Consistent with previous studies, these results emphasize that a certain level of technological development is a condition for establishing e-democracy, even though this factor is not a necessary condition. Norris’s (2001, p.106) statement elaborating on this theoretical dimension about a technological infrastructure as crucial, irrespective of socio-economic development is, though, hard to support since correlations between such dimensions are incredibly strong. Intuitively, this finding is expected, however, since without a certain level of technological activity e-democratic ambitions would be pointless. Future research that more closely investigates the necessary threshold of technology in which e-democracy is dependent on would be very welcome. A final important result is the importance of size, which throughout the analysis is a significant indicator of both the dependent variables. This factor appears to be self-evident in many inquiries into e-democracy, but it is seldom theoretically motivated and is of extra interest since it has had the opposite direction compared to the explanations of democracy (Anckar & Anckar 1995). The best-known causal explanation is put forward by Viborg Andersen and colleagues (2007), who stress that development of e-democratic functions actually costs money. There is therefore the risk that developing these functions does not reduce other costs for the government, but merely leads to additional ones. Reasoning strictly from an economic perspective will thereby enhance the possibility of larger societies being more e-democratic than smaller ones, ceteris paribus, through the
economies of scale. In terms of future research, investigations into how noted causal effects, in this study and elsewhere, actually transform into causal mechanisms would be of great value. This would be particularly welcome because contemporary research lacks empirically validated statements in this matter.
### Data Appendix

#### Table 4 Data Appendix

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Years covered</th>
<th>Comments</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combined Freedom House</td>
<td>1146</td>
<td>2003–2009</td>
<td>Average values of civil liberties and political rights</td>
<td>QoG⁹</td>
</tr>
<tr>
<td>Combined Polity IV</td>
<td>801</td>
<td>2002–2009</td>
<td></td>
<td>QoG⁹</td>
</tr>
<tr>
<td>Freedom House and Polity combined, with imputed values (FHP)</td>
<td>1484</td>
<td>2002–2010</td>
<td>Scaled down to range 0.0–1.0</td>
<td>The Authoritarian Regimes Dataset¹⁰</td>
</tr>
<tr>
<td>GDP/cap, PPP</td>
<td>1620</td>
<td>2002–2010</td>
<td></td>
<td>World Bank¹¹</td>
</tr>
<tr>
<td>Neonatal mortality rate</td>
<td>1665</td>
<td>2002–2010</td>
<td></td>
<td>QoG⁹</td>
</tr>
<tr>
<td>Average years of female education</td>
<td>1384</td>
<td>2002–2009</td>
<td></td>
<td>QoG⁹</td>
</tr>
<tr>
<td>Internet users (per 100 people)</td>
<td>1688</td>
<td>2002-2010</td>
<td></td>
<td>World Bank¹¹</td>
</tr>
<tr>
<td>Population</td>
<td>1719</td>
<td>2002–2010</td>
<td></td>
<td>World Bank¹¹</td>
</tr>
<tr>
<td>Globalization index (KOF)</td>
<td>1457</td>
<td>2002–2009</td>
<td></td>
<td>Dreher¹²</td>
</tr>
</tbody>
</table>

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¹¹ World Bank (2012), World Development Indicators.

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