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# Does intelligence explain why nations differ in online political participation?

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## Abstract:

Wide use of Internet and subsequent development of e-government initiatives have lent support to the emergence of e-platforms for political engagement, a relatively new direction of participatory governance. Although determinants of citizen political participation have been at the core of theoretical and empirical discussions for quite a long time, in this research we contribute to extant literature by investigating the effect of national intelligence, as measured by Lynn and Vanhanen (2012), on the e-participation levels for 192 countries of the world. Our results suggest that higher IQ nations demonstrate higher rates of online presence in political deliberations. A number of robustness tests is undertaken to show that our findings remain intact.

*Keywords:* IQ, intelligence, political participation, e-participation, ICT

## 1. Introduction

In the strand of psychological literature there has been a growing number of empirical evidence suggesting that cognitive skills are important in shaping political perception and related behavior of individuals. Indeed, higher IQ individuals have higher thinking ability which helps them build “a rational, active, self-controlled and farsighted lifestyle” (Rindermann, Sailer & Thompson, 2009, p. 4). As such they are more able “to distinguish information from misinformation, to develop realistic expectations about the politics and what is attainable thereby” (Rindermann, 2008, p. 309).

Empirical evidence indicates that one powerful channel through which intelligence may be associated with political involvement and democratic changes in society is social capital. Indeed, social interactions, especially those that are politically relevant, are believed to increase the capacity for political actions and thus enhance the likelihood of individuals to be politically active (Lake and Huckfeldt, 1998). Civic engagement, political participation, and trust as part of social capital lend support to what is known as social organization such as networks and norms to “... facilitate coordination and cooperation for mutual benefit ... where dense networks of interaction probably broaden the participants’ sense of self, developing the ‘I’ into the ‘we’...” (Putnam, 1995, p. 67).

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This is why social networks, formal and informal, real and virtual, play a crucial role in explaining citizen participation in politics (McClurg, 2003).

On the other hand, the role of social networks has expanded during the globalization era when the revolution in information and communication technologies has started to transform the nature of political activism. For example, wide use of Internet and subsequent development of e-government initiatives have given rise to the emergence of e-platforms for political involvement, a new direction of participatory governance. As a result, both conventional (voting, protests, NGO activity) and unconventional means (e.g. attending a civic forum) of citizen political participation have become available in a digital mode.

As e-participation, a democratic phenomenon of modern times, provides citizens with public information, engages citizens in deliberations on public policies and services, and involves citizens in policy design, it also has some advantages over traditional means of political participation (Irvin & Stansbury, 2004). First, it captures greater audience and thus is more socially inclusive. For instance, previously marginalized individuals and groups would now be more involved in political deliberations (Milakovich, 2010). Second, it may surmount barriers to political participation through reducing time and other efforts (Milligan et al., 2004; Highton, 1997). In this stance it only requires civic ICT access and skills. Third, e-participation contributes to the speed of spread of political information and helps exploit the right of the public to have access to information. Fourth, it can better inform citizens about political issues, facilitate debate or starting new campaigns (Milakovich, 2010). Overall, “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” (Jho & Song, 2015, p. 494). Wider political participation would also strengthen civil society and surveillance capacities of citizens over social ills such as corruption (Johnston, 1998).

Yet, as Jho & Song (2015, p. 493) point out “[a]lthough the purpose of ... 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”.

In this study we hypothesize that intelligence may be an important antecedent of e-participation as in the case of conventional political participation. The hypothesized intelligence-e-participation nexus is tested on a cross-country sample of 140 nations. A relatively modern measure of political participation, e-participation, comes from UN E-government Survey. After controlling for endogeneity the results indicate that one standard deviation unit increase in national IQ scores is associated with a 0.012 standard deviation units increase in e-participation.

The paper proceeds in the following way: Section 2 is on data and methodological issues; Section 3 provides econometric results and robustness tests; and Section 4 concludes.

## 2. Estimated Model and Data

### 2.1. The Model

To get the quantitative impact of IQ on e-participation, we estimate the following regression model:

$$EPI_i = \beta_o + \beta_1 IQ_i + \beta_x CV_i + e_i \quad (1)$$

where the dependent variable is e-Participation Index, EPI; IQ is an average national intelligence; and CV is a vector of control variables.

### 2.2. Data

#### *Dependent variable*

The e-participation index is based on an expert assessment survey of the online presence of 193 UN member states (UN E-government Survey). It measures how different countries are making use of their online tools and platforms to promote interaction between citizens and government, as well as among citizens.

The EPI embraces three dimensions of government-citizen cooperation: e-information sharing (provision of public information to citizens), e-consultation (interaction with citizens on public policies), and e-decision making (collaboration with citizens on policy design).

For the purposes of our study we specifically chose year 2014 because in that year e-participation questions were carefully modified to capture ongoing trends and modalities in how governments engage their population in public policy-making processes, their implementation and evaluation.

#### *Independent variable*

The key independent variable in this paper is a cross-country measure of nations' IQ levels, a proxy for national intelligence. They come from Lynn and Vanhanen (2012) and represent average IQ scores for 184 nations of the world. These IQ measures are derived from a vast amount of empirical literature that reported IQ scores for many countries of the world. National IQ data has been calculated in relation to a British mean of 100 and standard deviation of 15. The dataset is adjusted for the so-called Flynn Effect (Flynn, 1987; Williams, 2013; Lynn, 2013). The national IQ dataset has been extensively used in

cross-country literature to analyze the association between intelligence and economic growth (Jones & Schneider, 2006; Salahodjaev, 2015a), environmental quality (Salahodjaev, 2016; Salahodjaev & Yuldashev, 2016) and life satisfaction (Salahodjaev, 2015b).

**Table 1**

Descriptive statistics.

Variable	Source	Obs.	Mean	Std.dev.	Min	Max
E-participation	UN E-government Survey	192	0.39	0.26	0	1
IQ	Lynn and Vanhanen (2012)	184	83.83	10.82	60.1	107.1
GDP per capita (log)	WDI, World Bank	181	9.11	1.21	6.46	11.79
Internet users (per 100 people)	WDI, World Bank	188	38.49	28.59	0	96.21
Political globalization	KOF Index of Globalization	190	65.81	20.90	17.97	97.52
Press freedom	Freedom House	193	47.55	23.57	10	96
British legal origin	La Porta et al. (1999)	148	0.31	0.46	0	1
French legal origin	La Porta et al. (1999)	148	0.44	0.50	0	1
Muslim	Pew Research Center	193	24.89	36.69	0.1	99

**Table 2**

Correlation matrix.

	I	II	III	IV	V	VI	VII	VIII	IX
E-participation	1.00								
IQ	0.66	1.00							
GDP per capita	0.60	0.76	1.00						
Internet users	0.69	0.79	0.87	1.00					
Political globalization	0.49	0.41	0.25	0.36	1.00				
Press freedom	-0.32	-0.43	-0.41	-0.55	-0.33	1.00			
British legal origin	-0.03	-0.22	-0.07	-0.07	-0.15	-0.03	1.00		
French legal origin	-0.13	-0.27	-0.18	-0.27	0.01	0.15	-0.59	1.00	
Muslim	-0.22	-0.32	-0.21	-0.26	-0.02	0.42	-0.02	0.25	1.00

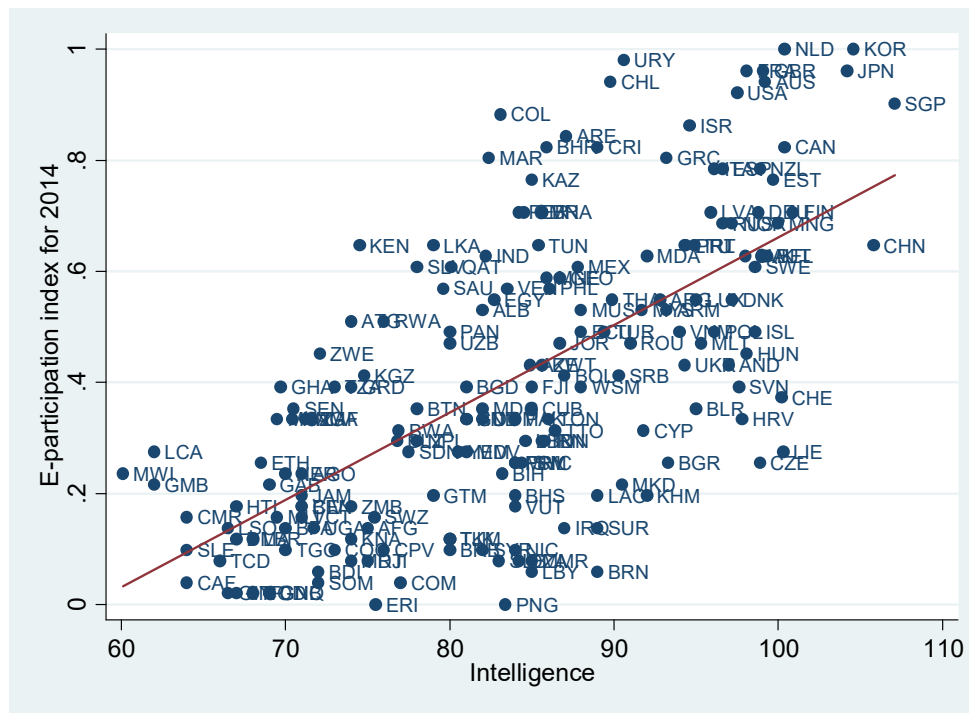
### *Control variables*

As suggested by the relevant literature on the possible antecedents of political participation and e-participation we also collected data for the following variables: GDP per capita in PPP terms, internet users per 100 people, political globalization, press freedom, British and French legal origins, and share of Muslim population in total population. The use of GDP per capita variable is important to capture the effects of

cross-country characteristics of income and related factors on e-participation. We include the internet users data into the regression as it reflects the technological development of the country. It is assumed that a higher share of internet users in a country mirrors a higher level of ICT infrastructure in place (Jho & Song, 2015). Another important determinant of e-participation is political globalization measured as part of KOF Index of Globalization. It essentially embodies such proxies of political openness as the number of embassies in a country, membership in international organizations, personnel contributed to U.N. Security Council Missions, and international treaties ratified (for more detail, see Dreher, 2006). Further, to reflect the institutional quality affecting the liberty of media we use Freedom House's Freedom of the Press index. It assesses the degree of print, broadcast, and digital media freedom in 199 countries and territories throughout the world. Literature shows that press freedom is one of the basic pillars of democratic society and most likely affects citizen political participation (Leeson, 2008; Jho & Song, 2015). We also add dummy variables for French Civil Law and English Common Law from La Porta, Lopez-de-Silanes, Shleifer & Vishny (1999). Indeed, legal traditions as proxies for political orientation of governments are important in this context as they may represent the readiness of governments towards providing opportunities for political dialogue with citizens. Finally, the model includes the share of population belonging to Muslim group in order to take account of the role of religious groups as civic associations in explaining their political activism (Brady, Verba, & Schlozman, 1995; Djupe & Grant, 2001; Ayers & Hofstetter, 2008).

All independent variables in this study are for 2012. Descriptive statistics of variables are presented in Table 1. Table 2 is a correlation matrix.

Fig. 1 graphically proves the hypothesis that national intelligence scores are positively associated with e-participation. The correlation coefficient between the variables indeed supports the case:  $r = .67$ .



**Fig. 1.** E-participation and intelligence.  
Source: UN E-government Survey and WDI.

### 3. Empirical Results

Table 3 presents stepwise regression results. A simple bivariate regression results between e-participation and IQ presented in column 1 indicate that the coefficient of intelligence is positive and statistically significant at 1% level. It turns out that the variance in intelligence quotient explains 42% of the variance in e-participation rates across countries in the restricted model.

We add logged GDP per capita to control for the effect of economic development on the e-participation levels of countries in the world (column 2). The coefficient of IQ remains statistically significant at 1%. The same is true for the coefficient of GDP per capita which brings to the conclusion that it is a relevant determinant of e-participation.

The inclusion of internet users, a proxy for technological capabilities of countries, into the regression supports the pertinence of it to the context: it is statistically significant at 1% and further contributes to the explanatory power of the model. In the meantime, in this and further steps one can observe that the coefficient of GDP per capita turns statistically insignificant. We suspect that this happens because of a slightly higher collinearity of this variable with a couple of other variables as can be noticed from the correlation matrix in Table 2. Nevertheless, this shouldn't be a concern in here as our variable of interest lies in IQ.

In columns 4 and 5 we introduce political and religious variables into the model. The results indicate that the extent of political globalization and press freedom are positively associated with citizen electronic participation in political deliberations. In countries representing British and French legal origins online political participation is more active than that of in other countries respectively. On the other hand, in countries with higher share of Muslim population e-participation is lower.

As can be seen, across all models the coefficient of national intelligence remains statistically significant at 1%. The coefficient of determination adjusted for the number of regressors indicates that the statistical power of the model is 61,1% at the maximum. Ramsey's RESET test conventionally used for testing the omitted variable bias shows that our model as specified in column 5 does not suffer from this problem. After all, one standard deviation unit increase in national IQ scores would be associated with 0.009 standard deviation units increase in e-participation rates, *ceteris paribus*.

However, one may argue that our study may suffer from a direction of causality problem between intelligence and e-participation. Indeed, it may be a case that more active online participation may bring about higher levels of intelligence due to a variety of reasons. One such explanation is that citizen activism in online forums and debates may enrich their political knowledge on the way to the revelation of truth and possibly reduce political information asymmetry. This in turn may contribute towards the improvement of cognitive abilities. Another possibility is that intelligence and e-participation are correlated with a third variable(s) which may be unobserved and not included into the model. These concerns are special cases of the so called endogeneity problem in econometrics. The ignorance of the problem in our context may result in biasedness and inconsistency of OLS estimates (see e.g. Gujarati, 2014).

**Table 3**

E-participation and intelligence: OLS results.

Models:	(1)	(2)	(3)	(4)	(5)
IQ	0.016*** (0.001)	0.012*** (0.002)	0.009*** (0.002)	0.006*** (0.002)	0.009*** (0.002)
GDP per capita (log)		0.055*** (0.017)	-0.007 (0.022)	0.003 (0.021)	-0.034 (0.023)
Internet users			0.004*** (0.001)	0.004*** (0.001)	0.006*** (0.001)
Political globalization				0.004*** (0.001)	0.004*** (0.001)
Press freedom				0.001 (0.001)	0.003*** (0.001)
British legal origin					0.173*** (0.043)
French legal origin					0.154*** (0.045)
Muslim					-0.001**



Constant	-0.914*** (0.096)	-1.058*** (0.105)	-0.419** (0.199)	-0.560*** (0.180)	(0.000) -0.773*** (0.222)
<i>N</i>	184	176	175	175	140
adj. <i>R</i> <sup>2</sup>	0.420	0.463	0.511	0.581	0.611

Dependent variable: e-participation index. Heteroskedasticity adjusted robust standard errors in parentheses.

\* p<0.10, \*\* p<0.05, \*\*\* p<0.01

In order to circumvent this problem we decide to apply an instrumental variable (IV) approach. This method accounts for the endogeneity of the IQ variable given all necessary conditions are met. The most important condition and sometimes a big challenge for researchers is that one needs to find such a variable (instrument) that is related to intelligence, but is unrelated to e-participation. The relevant literature reveals that ultraviolet (UV) exposure of population and continental dummies proved to be a viable option in such cases (Salahodjaev & Azam, 2015; Kanyama, 2014).

The suitability of ultraviolet exposure in this context can be explained through its negative association with cognitive abilities (MacKie, 2000; León, 2015). For example, León & León (2014, 2015) proposed a novel theory by showing that IQ gains of recent generations can be attributed to the following chain of effects: absolute latitude → UV<sub>B</sub> radiation → vitamin D<sub>3</sub> → parents' sexual hormones → family size → child's intellectual environment → IQ.

**Table 4**

E-participation and intelligence: IV and robust regression results.

Stage:	IV – 1 <sup>st</sup> stage	IV – 2 <sup>nd</sup> stage	RREG
Dependent variable:	IQ	E-participation index	E-participation index
IQ		0.012*** (0.004)	0.009*** (0.003)
GDP per capita (log)	2.088** (0.899)	-0.047* (0.027)	-0.036 (0.028)
Internet users	0.073** (0.031)	0.005*** (0.001)	0.006*** (0.001)
Political globalization	0.101*** (0.027)	0.004*** (0.001)	0.004*** (0.001)
Press freedom	-0.007 (0.023)	0.003*** (0.001)	0.003*** (0.001)
British legal origin	-5.182*** (1.255)	0.199*** (0.049)	0.180*** (0.048)
French legal origin	-2.681** (1.230)	0.176*** (0.049)	0.148*** (0.046)
Muslim	-0.038** (0.015)	-0.001* (0.000)	-0.001* (0.000)
UV exposure	-0.022* (0.013)		

Europe	5.734*** (1.919)		
Asia	10.011*** (1.441)		
America	4.465*** (1.570)		
Pacific	12.998*** (1.718)		
Constant	58.807*** (8.590)	-0.908*** (0.252)	-0.0735*** (0.252)
<i>N</i>	140	140	140
adj. <i>R</i> <sup>2</sup>	0.844	0.629	--
1 <sup>st</sup> stage F-stat (p-value)	82.54 (0.00)	--	--
Wooldridge's robust score (p-value)	--	9.457 (0.051)	--

Heteroskedasticity adjusted robust standard errors in parentheses.

\* p<0.10, \*\* p<0.05, \*\*\* p<0.01

By using data on UV exposure from Ashraf & Galor (2013) and continental dummies from CEPII database<sup>2</sup> as instruments, the regression results reported in Table 4 show that there is a strong relationship between the used instruments and national IQ scores. This can be verified through the adjusted coefficient of determination (*R*<sup>2</sup>) of the model which is high and equal to 84.4%. Moreover, first stage F-statistic also bolsters confidence for the choice and performance of proposed instruments: it is equal to 82.5 and statistically significant. We also check whether in such a formulation our independent variables are truly exogenous and not over-identified. The Durbin and Wu–Hausman test shows that the variables are exogenous as we fail to reject the null of exogeneity at the 5% significance level (p=0.305). The Wooldridge's robust score test of overidentifying restrictions indicates that we fail to reject the null of valid instruments at the same significance level (p=0.051). So both tests show that the variables are exogenous and the model is specified correctly.

To sum up, our IV estimation reveals that the IQ coefficient is 0.012 and statistically significant at 1% level. Hence, if mean country IQ increases by one standard deviation unit, the average e-participation goes up by about 0.012 standard deviation units, *ceteris paribus*.

### Table 5

E-participation and intelligence: alternative set of controls.

(1)

(2)

<sup>2</sup> Centre d'Etudes Prospectives et d'Informations Internationales database. Web-site: [www.cepii.fr/](http://www.cepii.fr/)

IQ	0.010*** (0.002)	0.006*** (0.002)
Government effectiveness	0.117*** (0.026)	0.134*** (0.025)
Telecom infrastructure	-0.098 (0.136)	-0.069 (0.139)
Urbanization (%)		0.002** (0.001)
Land area (log)		0.028*** (0.005)
Constant	-0.429*** (0.124)	-0.523*** (0.118)
<i>N</i>	184	184
adj. <i>R</i> <sup>2</sup>	0.497	0.581

Dependent variable: e-participation index. Heteroskedasticity adjusted robust standard errors in parentheses.

\* p<0.10, \*\* p<0.05, \*\*\* p<0.01

In this paper we also try to check the robustness of our findings. This is performed in two ways.

First, we re-estimate the initial model with a robust regression (RREG) technique (Table 4 column 3). This technique is an alternative to OLS regression when data is contaminated with influential observations. It is based on iteratively reweighted least squares where a certain weight is assigned to each observation with lower weights given to worse behaved observations. The outcome of employing such a technique exhibits that our variable of interest, national IQ scores, still remains intact at the 1% significance level.

Second, we re-estimate our model with an alternative set of controls. In particular, we follow Jho & Song (2015) and Gulati, Williams, & Yates (2014) for the general choice of antecedents of e-participation. As such, government effectiveness, a measure of institutional quality, telecom infrastructure, urban population as % total population and land area of countries are employed to seek for the robustness of earlier findings. The results demonstrate that national intelligence is indeed quite robust to a different setting of the same issue (Table 5).

#### 4. Conclusion

The Internet has brought a wide array of new opportunities to the modern society. It is used as an information source, as a communication medium and as a virtual public sphere and thus an important tool in public policy-making (Polat, 2005). Active use of these facets of the Internet leads to a higher individual propensity to participate in politics (McClurg, 2003). From this stance, e-participation is an emerging new phenomenon of the Internet era that utilizes "... information and communication technologies to broaden

and deepen political participation by enabling citizens to connect with one another and with their elected representatives” (Macintosh, 2008, p. 85).

Global citizens are making increasing use of ICTs to express their political attitude towards public policy issues. This happens in different formats: online debates, civic forums, opinion polls, political campaigns, electronic juries etc. Citizen political engagement in these formats has certain superiority over traditional means of political participation.

More broadly, many scholars perceive e-government to be a prerequisite to democratic transformations. More recent literature on the topic suggests that efforts to undertake democratic reforms through ICT will fail if only a technological component is given emphasis; rather, political institutions and technology should act in conjunction (Jho & Song, 2015).

In this paper we argue that individual cognitive abilities are also an important antecedent of online political activism and democratic changes in societies. This is especially true as “[p]eople in countries with low national IQs are not as able to organize themselves, to take part in national politics, and to defend their rights against those in power as people in countries with higher national IQs” (Vanhanen, 2009, p.270). Moreover, online civic participation requires not only civic ICT access, but also relevant skills and knowledge, which are functions of human capital (i.e. intelligence).

This paper aims to explore whether there is a link between intelligence as measured by mean IQ scores and online political participation in countries of the world. We find that national intelligence has a statistically significant positive association with e-participation rates. Our results remain intact even when we control for endogeneity of intelligence quotient and carry out several tests of robustness. Our findings highlight the importance of intelligence in democratic development of a society through its effect on e-participation rates. Thus, countries across the globe should facilitate educational reforms if they were to boost civic political participation and introduce democratic changes to the society.

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