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CROSS-CULTURAL ANALYSIS OF EUROPEAN E-GOVERNMENT ADOPTION

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ABSTRACT

In terms of adoption, the topic of e-government has focused on the supply side (or government-related issues) such as strategies and policy, challenges, technical issues, evaluation of the usability of e-government Websites; however, less attention has been given to the demand (or citizen's) perspective. Recent studies of the citizen adoption of e-government services suggest that trust, security, and transparency are the major issues for e-government adoption. The aim of this study was to explore whether cross-national differences in the adoption of e-government (Internet users who visited public authorities' websites in last three months to obtain information, download, and file forms) are associated with differences among national cultures as described in Hofstede's model of cultural dimensions (Power Distance, Individualism, Masculinity, Uncertainty Avoidance and Long-Term Orientation).

Key Words: e-government, e-government adoption, European e-government, European Culture, Cross-cultural difference

INTRODUCTION

E-government adoption is an international phenomenon. In terms of adoption, the topic of e-government has focused more on the supply side or government related issues such as strategies and policy, challenges, technical issues, evaluation of the usability of e-government Websites [1; 2]; but, the demand or citizen's perspective has been disregarded. Among the few that merit mention were related to trust and security and transparency issues [1]. The number of empirical studies undertaken in different countries to study e-government adoption has recently been increasing: for example, Singapore [3]; The Netherlands [4]; Turkey [5]; USA [6]; UK [1]. Each study contributes a strong theoretical understanding of the factors explored in its research model such as gender differences [5], PU (Perceived Usefulness) and PEOU (Perceived ease of use) [3], in addition to PU, PBC (The Perceived Behavioral Control) and 'worry' [4], in addition to PEOU, compatibility and trustworthiness [6], lack of accessibility and usability [1]. In general, the literature covers this subject in terms of theoretical framework, individual, and organizational factors. To the best of our knowledge, though, the cross-cultural reasons behind the adoption of e-government has not been considered before. Only one of these resources [5] suggested expanding this topic in terms of culture. Additionally a recent paper [7] studied the e-government adoption in two countries; the U.S. and the U.K. in terms of cultural differences.

Among the models that have been developed to analyze cultural differences [8,9], Hofstede's model of cultural indexes is perhaps the most widely known [10]. Despite some criticism [11,12] these indexes are aspects from which cultures can be compared [10]. They provide a general framework for analysis that can be easily applied because it reduces culture and its interactions to quantifiable dimensions [13,14]. Hofstede's model consisted of four cultural indexes: Power Distance, Uncertainty Avoidance, Individualism, and Masculinity. Later the study has been replicated in other settings and other countries. Based on a Chinese Value Survey, a fifth dimension was found: Long-versus Short-Term Orientation (LTO) [9].

The cross-cultural differences, as source of acceptable norms and behaviors, may influence online expectations, preferences, and experiences of the public attitudes towards e-government adoption and the results may help us to extend our understanding of the e-government adoption from a

different point of view. Cultural factors also are known to play an important role in ICT/IT/IS adoption [15,16,17]. Most cross-cultural comparisons are directly related to one, two, to three countries (e.g. individual level of culture at work; cross-cultural models to support companies' localization strategies on the Web, website differences) [15,18,19]. Another research [10], perhaps one of the best studies of cultural factors and ICT relationship, found national culture and the ICT adoption rate of a country to be closely related. They acknowledged that Hofstede's dimensions are important in influencing ICT adoption. In particular, the power distance and the uncertainty avoidance dimensions seem to be the most important. Another study [20] investigated if the differences in worldwide e-government readiness levels are explained by cultural variables. It was found that national cultural indicators have a moderate impact on the e-government readiness worldwide. Among four cultural dimensions individualism and power distance are the only significant variables that could be used to explain differences in level of e-government readiness.

Another strand, the innovation literature, also provides evidence of cross-cultural influence on innovativeness. According to Herbig and Dunphy (cited by [21]), societies which provide a suitable environment for innovative ideas are distinguished by:

- Higher individualism,
- Willingness to take risks,
- Readiness to accept change,
- Long-term orientation,
- Low on power/status/hierarchy (low power distance),
- Weak uncertainty avoidance,
- Openness to new information,
- Frequent travel,
- Positive attitude towards science,
- Value of education to society (high education levels),
- Early adapters,
- Religion

Likewise, another research which explored the influence of culture on innovation (Shane 1993; 1995-also cited in [21]) suggests that rates of innovation (measured as per capita number of trademarks) are mainly influenced by low uncertainty avoidance; a dominant factor, even more important factor than per capita income. Although to a lesser degree, weak power distance and strong individualism were also shown to be related to innovation.

CULTURAL VARIABLES AND HYPOTHESES

Power Distance (PD):

Power Distance is the degree of hierarchy in a country. It is defined [9] as the extent to which the less powerful members of organizations and institutions accept and expect power to be unequally distributed. The higher the power distance index, the greater the dependency of subordinates on their bosses. Organizations of this kind have been associated with lower rates of innovation and adoption [10]. Even the PD dominant cultures are expected to be less open to new ideas. Thus:

Hypothesis 1. Countries with a high PD index will show a lower rate of e-government adoption than countries with a low PD index.

Uncertainty Avoidance (UA):

Uncertainty is described as ‘the extent to which the members of a culture feel threatened by uncertain or unknown situations.’ [9] UA shows a society's tolerance for uncertainty and ambiguity. A higher index indicates that people feel uncomfortable in novel, unknown or surprising situations. Countries characterized by strong uncertainty have a tendency to perceive new ideas and different things to be dangerous. The economic theory (Stoneman 2001-cited in [10]) postulates that adopting a new technology is similar to any other kind of investment under uncertainty. Given that, adoption of a new technology involves risk and uncertainty [10], and dealing with something new, the degree of uncertainty that may be attached to it is also greater (Stoneman, 2001-cited in [10]). It is expected that societies in countries with a high index on UA are more risk-averse and do not approve of making changes (or ‘doing something for the first time’). Thus:

Hypothesis 2. Countries with a high UA index show a lower rate of e-government adoption than countries with a low UA index.

Individualism (ID):

This dimension is defined as the degree to which individuals are integrated into groups. People from countries with high indexes on ID are expected to make their own choices, while people from countries with low indexes are considered to expose willingness to conform to the norms of the group. It is argued [10] that spiral of silence theory (citing Noelle-Neumann's 1974) may explain why some people are dissuaded from expressing their true opinion if they feel that it runs counter to the majority opinion. Thus adopting a new concept can be received as a conflicting attitude against the dominant group norm; likewise countries with a strong emphasis on the group are expected to show a lower degree of e-government adoption. People from individualistic countries are educated for expressing their own views and are therefore more inclined to innovate and adopt new ideas [10]. Since the innovation theory claims that such freedom to think and act independently nourishes a context where innovative ideas may flourish freely, we posit:

Hypothesis 3. Countries with a high ID index show a higher rate of e-government adoption than countries with a low ID index.

Masculinity (MAS):

Masculinity, as opposed to femininity, refers to a culture in which the emotional roles of the two genders are clearly separated. A higher index indicates an assertive, competitive and performance focused culture [9]. On the other hand, feminine cultures reflect a more solidarity, equality, consensus seeking and concerning centered social relationships [10]. Masculine cultures emphasize rewards and recognition of performance as well as training and improvement of the individual; an ideal environment where innovative organizations prosper. Thus:

Hypothesis 4. Countries with a high MAS index show a higher rate of e-government adoption than countries with a low MAS index.

Long Term Orientation (LTO):

With regard to LTO, the countries with this orientation incline towards the future and are more dynamic, while the low LTO ones are past and present orientated and are more static. Since low LTO cultures impose more importance on tradition they may not be open in terms of creative expression

and novel ideas. On the other hand people from LTO cultures don't value tradition as much as the others, and are therefore likely to be willing to fulfill the most innovative plans as long as they get to participate fully. Thus:

Hypothesis 5. Countries with a high LTO index will show a higher rate of e-government adoption than countries with a low LTO index.

The aim of this study is to test the aforementioned hypotheses and further explore whether cultural dimensions are significantly correlated with cross-national differences in the adoption of e-government among 26 European countries. Figure 1 shows our proposed research model.

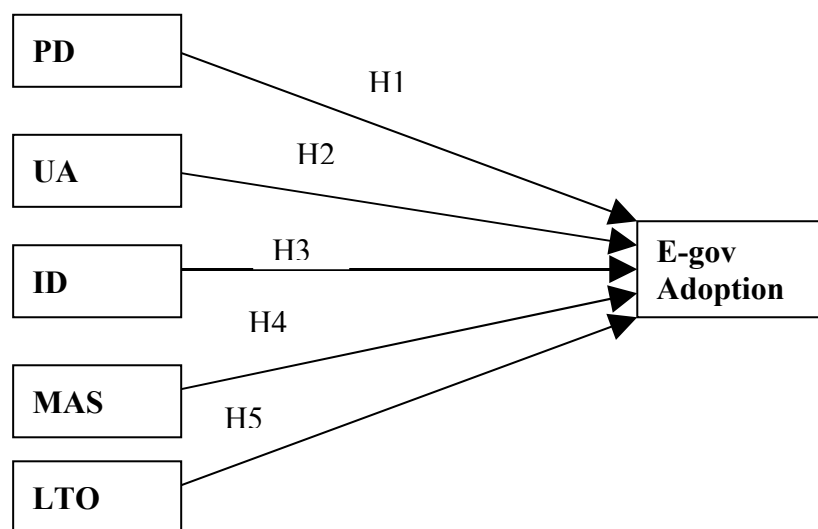


Figure 1. The Proposed Research Model

MATERIALS AND METHODS

Data on the use of e-government were provided by EUROSTAT's website, based on the e-government use in 2008. The e-government adoption variables, common to 26 countries, are measured through the Internet users who visited public authorities' websites in last three months for obtaining information, downloading, and online filling of forms. The sampling consists of 26 European countries. The data for Croatia were not available at the time of research, so we omitted her from the list.

As for the cultural indexes, the data were obtained from Hofstede's website: http://www.geert-hofstede.com/hofstede_dimensions.php. We used the same procedure from an earlier study [10]. We have divided the countries in dataset into two different groups (lower and higher) per cultural dimension by taking the median of each dimension as a cut-off point. Table 1 shows the full dataset; e-government adoption variables and cultural indexes together.

The GDP data was obtained from EUROSTAT's website. Including GDP as a controlling variable is suggested when examining the effect of national culture [20]. By referring to Hofstede he posits that if the cultural variables are significant in spite of included economic variables for controlling, then the effect of culture on observed phenomenon, i.e. e-government adoption and its components could be confirmed.

Table 1. E-government Adoption Variables and Cultural Indexes

Countries	e-Government adoption variables (*) (2008)	CULTURAL INDEXES					GDP per capita 2007 (Euro)
		PD	IDV	MAS	UAI	LTO	
Sweden	33,3	31	71	5	29	33	30500
Netherlands	37	38	80	14	53	44	33900
Austria	24,3	11	55	79	70	31	30900
Denmark	32	18	74	16	23	46	29700
Poland	9,43	68	60	64	93	32	14400
UK	17,5	35	89	66	35	25	29400
Belgium	8,83	61	78	43	97	38	28800
Czech Rep.	7,63	57	58	57	74	13	20100
Lithuania	14,9	42	60	19	65	-	15300
Luxemburg	29,1	40	60	50	70	-	68100
Slovenia	17,3	71	27	19	88	-	22700
Romania	5,1	90	30	42	90	-	11500
Ireland	19,7	28	70	68	35	43	34300
Malta	12,1	56	59	47	96	-	18900
Italy	9,77	50	76	70	75	34	25200
Slovakia	18,7	104	52	110	51	38	18000
Bulgaria	4,73	70	30	40	85	-	10100
Estonia	27,2	40	60	30	60	-	17100
Finland	32	33	63	26	59	41	28900
France	31,7	68	71	43	86	39	26900
Germany	19,3	35	67	66	65	31	29100
Greece	5,47	60	35	57	112	-	23500
Hungary	16,8	46	80	88	82	50	15700
Norway	37,2	31	69	8	50	44	33500
Portugal	13,3	63	27	31	104	30	18900
Spain	17,5	57	51	42	86	19	25900
EUROPE	19,3	50	60	46	70,5	35	25434,62

(*) This indicator is the mean of obtaining information, downloading forms, returning filled in forms and covers all individuals aged 16 to 74 in 2008 (EUROSTAT).

Table 2 shows the cut-off points and the resulting means and standard deviations of the low and high group of each dimension. Results gained from paired sample T-tests show that the difference between the low and the high group is significant for every index. For the LTO index, only 18 countries' (out of 26) results were available.

Table 2. Descriptive Statistics and breaking down of Independent Variables

Variables	High				Low				P	
	n	Median	M	SD	n	Median	M	SD	t	Sig (2-tailed)
PD	13	63	67,31	14,82	13	35	32,92	9,67	13,32	.000*
UA	12	72,5	74	7,05	14	53,5	47,43	14,05	3,06	.009*
ID	12	66	68,5	17,37	14	28	27	13,64	6,338	.000*
MAS	13	88	89,85	10,72	13	53	51,15	15,93	18,74	.000*
LTO	9	43	42,56	4	9	31	27,56	7,18	10,06	.000*

* $p < ,05$

These results indicate that the procedure of creating two different groups is appropriate. To understand the relationship between e-government adoption (dependent variable) and cultural indexes (independent variables) Pearson correlation coefficient was used. A p-value of 0.05 or smaller was considered significant. Concerning further sample comparisons among variables in pairs, difference between higher groups and lower groups in terms of e-government adoption, independent-sample t-tests were conducted.

RESULTS

Table 3 contains the descriptive statistics and correlation results for all constructs in the research model. There is a high significant negative relationship between the e-government adoption (e_gov) and constructs such as power distance $r(N = 26) = -, 563$ and uncertainty avoidance $r(N = 26) = -, 643$. There is also a significant negative relationship between e-government adoption and masculinity $r(N = 26) = -, 424$. The rest such as individualism $r(N = 26) = , 461$, and long-term orientation $r(N = 26) = , 513$ showed significant positive relationships. E-government adoption appears to have a high correlation with GDP per capita $r(N = 26) = , 555$. However, experiencing with GDP in the model indicates no observable effect on the independent variables except for power

distance r ($N = 26$) = ,487. This result might suggest that economic factors, as measured by GDP per capita, may have a direct effect only on e-government adoption.

Table 3. Descriptive Statistics and correlation results

Variables	M	SD	1	2	3	4	5	6	7
1.e_gov	19,3	10,3	1	-,563**	,461*	-,424*	-,643**	,513*	,555**
2.PD	50,1	21,4		1	-,539**	0,273	,560**	-0,19	-,487*
3.ID	59,7	17,5			1	0,08	-,568**	0,386	0,356
4.MAS	46,2	26				1	0,151	-0,13	-0,1
5.UA	70,5	23,8					1	-0,27	-0,34
6.LTO	35,1	9,56						1	0,219
7. GDP									1

$N=26$

** . Pearson Correlation is significant at the 0.01 level (2-tailed).

* . Pearson Correlation is significant at the 0.05 level (2-tailed).

To test the proposed hypotheses and to compare the means of higher and lower cultural indexes on e-government adoption, independent samples T-tests were performed. The results are given below:

Table 4. Independent sample T-test results

Variables	High (N=13)		Low(N=13)		t	P
	Mean	SD	Mean	SD		
PD	12,44	7,4992	26,17	7,9098	-4,54	,000*
UA	12,29	7,3821	26,32	7,7352	-4,73	,000*
ID	24,58	10,359	14,78	8,0835	2,658	,012*
MAS	15,81	7,0861	22,29	11,857	-1,72	0,11
LTO	25,99	10,137	16,89	8,1875	2,094	,053*

* $p < ,05$

Hypothesis 1 (supported): It was predicted that the countries with high PD indexes would show lower rates of e-government adoption than the countries with low PD indexes. An independent samples T-test (Table 4) was conducted to compare the mean for the higher power distance group ($M=12,44$, $SD=7,5$) with that for the lower group ($M=26,17$, $SD=7,9$). The alpha level was .05. This test was found to be statistically significant, $t(24) = -4,54$, $p = .000$.

Hypothesis 2 (supported): It was predicted that the countries with high UA indexes would show lower rates of e-government adoption than the countries with low UA indexes. An independent samples T-test (Table 4) was conducted to compare the mean for the higher uncertainty avoidance

group ($M=12,29$, $SD=7,4$) with that for the lower group ($M=26,32$, $SD=7,7$). The alpha level was .05. This test also was found to be statistically significant, $t(24) = -4,73$, $p = .000$.

Hypothesis 3 (supported): It was predicted that the countries with high ID indexes would show higher rates of e-government adoption than countries with low ID indexes. An independent samples T-test (Table 4) was performed to compare the mean for the higher individualistic group ($M=24,58$, $SD=10,4$) with that for the lower group ($M=14,78$, $SD=8,0$). The alpha level was .05. This test also was found to be statistically significant, $t(24) = 2,66$, $p = .012$.

Hypothesis 4 (not supported) : We predicted that the countries with high MAS indexes would show higher rates of e-government adoption than the countries with low MAS indexes. An independent samples T-test (Table 4) was performed to compare the mean for the higher masculinity group ($M=15,81$, $SD=7,1$) with that for the lower group ($M=22,29$, $SD=11,9$). The alpha level was .05. But this test was found to be statistically insignificant, $t(24) = -1,72$, $p = .111$.

Hypothesis 5 (supported): In our last hypothesis, we anticipated that the countries with high LTO indexes would show a higher rate of e-government adoption than the countries with low LTO indexes. An independent samples T-test (Table 4) was performed to compare the mean for the higher long term orientation group ($M=25,99$, $SD=10,1$) with that for the lower group ($M=16,89$, $SD=8,2$). The alpha level was .05. This test was found to be statistically significant, $t(16) = 2,09$, $p = .053$.

DISCUSSION

Our study indicates that European countries with higher PD and UA cultures have a tendency to adopt e-government lower. On the other hand, the European countries with high ID cultures are inclined to adopt e-government more willingly than the collective ones. As for the high MAS European countries, the results are quite the opposite. We predicted higher adoption but our analyses showed lower mean with no statistical support. European countries, which focus on LTO more, appear to be adopting e-government higher. Interestingly, in one of the earlier studies [20] on e-government readiness and cultural dimensions, no statistical significant correlations for MAS and UA indexes were reported. After controlling the GDP, we observed no significant effect on the independent variables except for PD. This provided confidence that the measures were functioning effectively. However, the

correlation coefficient of GDP higher than ID, MAS, and LTO may suggest that economic factors, as measured by GDP per capita, are more important than these three cultural constructs. Strong relationship between e-government adoption and GDP may also lead to conclude that countries with high income tend to use e-government more than the low-income countries.

Our results are also highly consistent with the previous findings from various disciplines (Table 5).

Table 5. Comparison of the Findings with Previous Research

Constructs	Discipline	Previous Findings	Our Findings
High individualism	ICT/IT/IS and Economy	High ICT adoption/High innovativeness	High e-government adoption
Long term orientation	ICT/IT/IS and Economy	High ICT adoption/High innovativeness	High e-government adoption
Low power distance	ICT/IT/IS and Economy	High ICT adoption/High innovativeness	High e-government adoption
Low uncertainty avoidance	ICT/IT/IS and Economy	High ICT adoption/High innovativeness	High e-government adoption

CONCLUSION AND FUTURE RESEARCH

Cultural dimensions are a simple but useful tool to measure the extremely complex concept of culture. Moreover, our study suggests that culture does play a significant role on e-government adoption for European countries. Besides, these findings may have implications with regard to pursuing the effects of cross-cultural issues further on e-government. For example, the comparison of the effects of sub-cultural values of European countries on e-government adoption may be worth to consider.

Our study has some limitations. We tried to test the validity of the ‘culture-specific’ argument as an explanatory construct for e-government adoption. Cultural indexes may not be the only factors influencing the adoption rates. Factors such as education level, Internet diffusion and most important of all the very nature of culture (difficulty to isolate, define and measure; the local culture) should also be regarded for an in-depth analysis.

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