E-government adoption and the impact of Greek farmers' cultural issues on trust towards agricultural e-government services

Vasilia Peppa, Artemisia Poutoka & George Metaxas

Technological Education Institute of Piraeus
Piraeus-Athens, Greece

ABSTRACT: The supply of e-government services by public organisations is outlined in this article. The authors explore the demand for these by citizens utilising primary data from Greek farmers. Statistical analysis revealed current attitudes of Greek farmers towards agricultural e-government, their level of trust or risk perceptions and their national cultural profile. A gap between the farmers' willingness to adopt agricultural e-government and the current usage of these services was disclosed and also the importance of correlations among trust, risk perceptions and national cultural issues was underlined. The correlational research revealed low, moderate and/or partly significant relationships among the aforementioned items in some cases, as well as totally insignificant ones in others. The main contribution of this study is focused on the understanding of direct and indirect implications of farmers' national cultural issues on trust, risk perceptions and intentions to use agricultural e-government, as well as suggestions on how national culture could shed light on the most effective trust-building mechanism.

INTRODUCTION

Since the time that individuals organised themselves into social structures, they had to interact with governments for satisfying various needs. As time goes by, citizen satisfaction and trust in governments transmuted into wide distrust of such organisations [1]. Nowadays, e-government begets a new up-and-coming era for benefiting both citizens and governments with public services through modern ICT and interactions redefined on either side [2]. Principally, the agricultural public sector benefits more than any other by expanding activities into rural areas, while farmers take advantage of using faster and clearer agricultural e-government services without wasting their valuable working time in going to these organisations to be served [3].

Although countries invest more than 1% of GDP to adopt e-government [4], only 15% of such projects succeed, whereas between 35% and 50% fail wholly or partly [5].

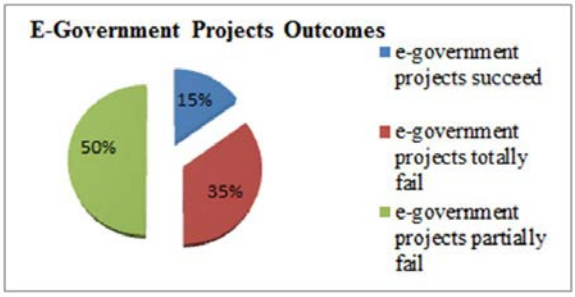

Figure 1: E-government projects' outcomes.

To assess the outcomes of e-government projects, technology is routinely proposed in the literature [5]. Despite *hard* issues with which e-government is assessed, *soft* ones of policy, society, and culture fields are also important benchmarks [4]. The low citizen e-government usage is precarious [6], as favourable outcomes for e-government plans depend on these services being embraced [7]. Better supply and demand for e-government is possible by examining end-users' requirements and expectations [6] and preparing meaningful insights to be utilised in decision-making [8]. The aim of this project is to: 1) highlight the supply of e-government services in terms of vision and current realisation from the global, European and Greek viewpoint; and 2) to investigate current citizen e-government adoption in Greece through farmers' attitudes towards agricultural e-government services. The case of Greek farmers suits the purpose better because: a) 39.2% of the Greek population is rural [9]; b) farmers could reap strategic advantages from

e-government services, obliterating the substantial distances from agricultural public organisations with their inflexible set opening times [3]; and c) the statistics of 2006 show European Internet users of rural areas are more reluctant to adopt e-government than townspeople [10].

Understanding why farmers ignore the benefits of using traditional public services could better explain e-government adoption. Especially, exploration of current farmers' trust and risk perceptions that positively or negatively can impact on their intentions to adopt agricultural e-government, as well as the way that cultural traits relate to such issues constitute the major objectives of this project to further determine the most effective trust-building mechanism.

RESEARCH METHODOLOGY

The authors utilised the Internet to access libraries and relevant Web sites for researching journal articles, scientific conferences, books and reports, so as to find relevant information on the origin of both sides of e-government adoption. After accomplishing the one purpose of outlining the current state of supply of e-government services with remarkable insights, the authors focused on exploring the demand-side research objectives through adopting a quantitative research methodology. It is the most congruent approach for cases that focus on generalisation to a population for the identification of frameworks and relations [11].

Data Collection

Since the project aims to identify relations between variables, the authors adopted survey and correlational research methods [12]. After considering the literature thoroughly, the authors absorbed relevant knowledge that was integrated into the questionnaire which was the basis for the survey study. Since parallelism between e-government and e-commerce is evident, the already mature e-commerce literature can induce similar outcomes in the emerging e-government area [13]. Hence, the primary purpose of the questionnaire was to identify farmers' intentions to use agricultural e-government through integrating both e-government and e-commerce literature in the form of the independent variables of trust, risk perceptions and national culture. The targeted sample consisted of 150 farmers from the region of Larissa; they had one week in which to complete and return the paper-based questionnaires to the authors.

Questionnaire Development

The questionnaire incorporates four fundamental sections with nine constructs and 38 items. Section A introduces seven questions for constructing the participants' profile, while the others include constructs that employ a seven-point Likert scale for better investigation of their behaviour [14]. The authors adapted the ratings from *strongly disagree* to *strongly agree* from the study of Wu and Chen [15] that discussed acceptance of e-taxes, and then codified the responses with numbers from 1 to 7 to perform statistics [11]. Each construct was evaluated with more than two items for securing significant computation with precise and explicable findings [16]. For ensuring consistency and validity, all the items originated from supported constructs in the literature adapted properly by the authors [17]. The questionnaire was tested by the authors in co-operation with three farmers and verbal changes were effectuated [18].

RESEARCH FINDINGS AND STATISTICAL ANALYSIS

On the one side, research into the literature of the supply-side e-government adoption revealed remarkable findings:

1. The global state of the supply of e-government services is characterised by a great incongruity as some countries managed to effect their vision but for others this presents some degree of difficulty. There are 20 countries that act as good performers on e-government adoption [19].
2. Despite the common vision of an *e-Europe* [20] and adopted projects [21], the European supply-side e-government adoption indicates similar variation. Regarding the European Commission's predetermined 20 fundamental public services [21], some countries offer high *sophistication* and *full on-line availability*, such as the UK and Austria; and others, such as Croatia are less effective [22].
3. Although the current state of the Greek supply-side e-government adoption has improved being in the 41st global position in 2010 [19], it is still far behind realising its vision viz. *an electronically modernised Greek Public Administration* [23]. The current state of the Greek supply of e-government services is unsophisticated [24] being more informational than transactional and connected [19].

On the other side, survey and correlational research on the demand-side of e-government adoption returned remarkable and dependable findings. The authors employed the statistical software package SPSS 17.0 to measure items' reliability, as well as the validity and correlations of constructs [25].

Reliability Analysis

Most of the constructs indicate values of alpha in the range of 0.781 to 0.926; hence, the authors infer their reliability since these exceeds 0.70 that constitutes the broadly acceptable threshold [26]. For the constructs of *trust in government*

and *masculinity/femininity,* alpha equals 0.693 and 0.691, respectively. Considering that both constructs approximate to 0.70 and are far above the lowest norm of 0.50, the authors classify these as reliable, too [27].

Descriptive Statistics

The authors performed descriptive statistics, widely adopted in the literature, as it offers an illuminating analysis of precise responses [18].

Descriptive Statistics of the Participants' Profile

Of the 150 survey instruments, 121 were returned giving a response rate in the order of 71%. The final response rate was reduced to 67%, since four of the instruments were not usable because they carried sparse responses. The authors entered the data into SPSS to analyse and extract findings. First, the authors analysed the participants' profile.

Data-Related Descriptive Statistics

The research findings reveal valuable insights regarding the variables under consideration. Since each construct is evaluated with more than one item, the authors performed descriptive statistical analysis by computing the average of assigned scores [28]. Especially:

1. *Intention to Use:* 37.9% of responses show intentions to use agricultural e-government, whereas 57.7% and 4.4% indicate reluctance and detachment, respectively.
2. Trust in agricultural e-government is visible through:

    a. Only 13.5% of participants' *trust Internet technologies* with the vast majority of 71.4% appearing to be distrustful and the remaining 15.1% to be detached.
    b. Only 3.4% of responses disclose *trust in government* regarding agricultural public organisations, the political system and administration. The overwhelming majority of participants (91.5%) show a lack of trust, while a small percentage of them (5.1%) show detachment.
    c. Participants' *disposition to trust* was 18.8% with 6.6% of them indicating a detached attitude. Last, most participants (74.6%) show to a greater or lesser degree no tendency to trust.

3. Numerous *risk perceptions* of agricultural e-government services are demonstrated by the great percentage of respondents (89.9%), whereas only a small percentage (6.9%) do not show such perceptions and a smaller one (3.2%) reflects detachment.
4. Last, national cultural information is available through:

    a. *Individualistic behaviour* of the sample by 28.8%, while 67.5% and 3.7% of it demonstrated collectivistic and detached behaviours, respectively.
    b. The extraordinary percentage of 91.7% of respondents want to *avoid uncertainties*, with only 0.3% of them demonstrating neutrality and the other 8.0% tolerance.
    c. 67.1% of respondents perceived and adopted *power distance*, whereas 29.9% of them pretended the opposite and the remaining 3.0% kept detached behaviour.
    d. *Masculinity/Femininity* 53.6% of respondents were oriented towards material objectives, 43.0% were oriented toward social targets and 3.4% were detached.

INFERENTIAL STATISTICS

The fundamental purpose of the project was to identify current intentions of Greek farmers toward agricultural e-government services by examining whether trust and risk perceptions may contribute positively or negatively, or whether the national culture underlies attitudes.

Validity of Variables and Correlations

Pearson Correlation Coefficient was used to assess the internal validity of variables [29]. Significant correlations characterise each case, apart from one item for the constructs of trust in government and risk perceptions. Almost all bivariate correlations were found to be weakly to very strongly dependable at the p levels of 0.01 and 0.05 (2-tailed test), except trust in government in terms of public administration and risk perceptions in terms of concerns about the activity of political actors.

Pearson correlations were also employed by the authors to examine the force and direction of the linear relationships between the dependent variable and the independent ones in a range from -1 to 1 [11]. Most of these relationships are significant from slight to strong but on average these indicate low to moderate dependability, as shown in the following table.

Table 1: Inter-correlations among the constructs.

1. Trust in Internet	1								
2. Trust in Government	0.459**	1							
3. Disposition to Trust	0.489**	0.403**	1						
4. Perceived Risk	-0.461**	-0.367**	-0.477**	1					
5. Individualism/ Collectivism	0.281*	0.056	0.354**	-0.308	1				
6. Uncertainty Avoidance	-0.485**	-0.361**	-0.523**	0.555**	-0.223*	1			
7. Power Distance	-0.302*	-0.155	-0.329*	0.341*	-0.384**	0.243*	1		
8. Masculinity/ Femininity	0.020	-0.037	0.008	-0.060	-0.007	-0.079	-0.095	1	
9. Intention to Use	0.443**	0.335*	0.518**	-0.498**	0.340**	-0.489**	-0.333*	0.053	1

**Correlation is significant at the 0.01 level (2-tailed)
*Correlation is significant at the 0.05 level (2-tailed)

Especially:

1. *Intention and Actual Use of Agricultural e-Government Services*: currently, 37.9% of Greek farmers intend to use agricultural e-government services, whereas just 11.1% already used such services.
2. Trust and Risk Perceptions of farmers towards agricultural e-government:

    a. *Correlations between Trust and Intentions:* a moderate significant relationship (r = 0.450) exists between farmers' trust in agricultural e-government services and their intentions to use them. Especially, farmers' trust in Internet technologies predicts their intentions since it is moderately (r = 0.443) related to these. Additionally, trust in government also predicts farmers' attitudes but to a smaller extent since it has a low correlation (r = 0.335). This relationship reveals an interesting finding concerning the absolute distrust (100%) of farmers towards political actors. However, this item is not significantly (r = -0.061) correlated with farmers' intentions. Lastly, farmers' dispositional trust can predict to an even greater extent their intentions to use agricultural e-government as shown by the direct moderate (r = 0.518) correlations with these and indirect ones with their trust in the Internet (r = 0.489) and agricultural public organisations (r = 0.403). All these correlations reveal the factors where farmers' intentions (37.9%) towards agricultural e-government services are dependent. The low levels of farmers' trust in the Internet (13.5%), in government (3.4%), or their dispositional trust (18.8%) can impact on their current intentions. Hence, the scenario of farmers' trust in agricultural e-government services reflects their *adversarial* culture towards both the Internet and government, with terrible effects on both sides for the adoption of such services [30].
    b. *Correlations between Perceived Risks and Intentions*: a moderate correlation (r = -0.498) exists between farmers' risk perceptions and intentions towards agricultural on-line public services. Another impressive finding concerning perceptions of risk pertains to concerns about the activity of political actors (100%). However, it is not significantly (r = 0.061) related to the dependent variable.

3. *Correlations between Trust and Risk Perceptions*: there is a moderately dependant relationship between trust in the Internet and risk perceptions (r = -0.461) while, with trust in government, there exists a low dependency (r = -0.367). A very interesting finding involves the perfect negative relationship (r = -1) between farmers' concern about the activity of political actors and their trust in government in terms of public administration.
4. *National Culture, Correlations, and Potential Implications*. At what level farmers develop trust or perceive risks may come from the national cultural profile and its potential direct and indirect implications on their willingness to use agricultural e-government [31]. A typical Greek farmer behaves in a collectivist way, strongly avoiding uncertainties and showing a slightly higher level of power distance and masculinity. Especially:

    a. *Individualism/Collectivism Correlations*: a low significant relationship (r = 0.340) is revealed between the slightly high farmers' collectivism and their intentions towards agricultural e-government. Hence, farmers' intentions depend on this index but to a small extent and, as such, their prevalent collectivistic behaviours

may have a small impact on these. Another low significant relation (r = 0.354) between individualism/collectivism and farmers' dispositional trust is evident. Since high collectivism is prevalent, this background plays its own negative role in their low trust disposition towards agricultural e-government. Unexpectedly, farmers' high collectivism had no significant relation (r = 0.056) with their low trust in government especially in agricultural public organisations. Contrarily, farmers' trust in the Internet (r = 0.281) relates to cultural issues, except for their trust in benevolence of the agricultural government Web sites. Hence, farmers' collectivistic background is responsible in a small way for their low Internet trust, but it is not the factor for their very low trust in government, which may be influenced by external variables, such as the economic crisis. Furthermore, significant correlations were also revealed between collectivism and farmers' Internet trust in terms of ability and integrity but not of benevolence. The survey also revealed a low dependable relationship (r = -0.308) between individualism/collectivism and risk perceptions, except those of performance, privacy and political actors' activity, with potentially small negative indirect implications of this index on farmers' intentions.

b. *Uncertainty Avoidance Correlations*: Farmers' uncertainty avoidance moderately and significantly (r = -0.489) relates to their intentions, revealing that the high degree with which they avoid uncertainties can explain their current low intentions because of moderate implications. There is also a moderate positive relationship (r = 0.555) between farmers' uncertainty avoidance and risk perceptions that is also dependable, except their concerns about the activity of political actors. Hence, this index may negatively impact on farmers' intentions in a roundabout way. Furthermore, a moderate significant relationship (r = -0.523) connects farmers' uncertainty avoidance with their dispositional trust. Farmers' low trust dispositions depend upon their high uncertainty avoidance; hence, these may have negative implications on their intentions towards agricultural e-government. Subsequently, a moderate significant correlation (r = -0.485) connects farmers' uncertainty avoidance with their Internet trust and a low correlation (r = -0.361) with trust in government. Therefore, farmers' uncertainty avoidance may mediate between their trust and intentions towards agricultural e-government, with a negative impact on these.

c. *Power Distance Correlations*: The research reveals a dependable relationship (r = -0.333) between farmers' high power distance and their intentions. Hence, potential negative responsibility of power distance for farmers' current attitudes towards agricultural e-government is small. The high power distance lowly and significantly (r = -0.329) correlates with trust dispositions. This implies that farmers' trust dispositions may be affected by such cultural issues by generating small negative implications for their intentions. Also, a low significant correlation (r = -0.302) between farmers' power distance and Internet trust and a slight non-significant one (r = -0.155) with their trust in government, are evident. Hence, farmers' high power distance may explain their low Internet trust, although to a small extent, but not at all their too-low trust in government. Last, farmers' high power distance lowly and significantly (r = 0.341) relate to their risk perceptions except for the perceived performance and activity of political actors. This may also denote a small responsibility of power distance for current intentions to use agricultural e-government.

d. *Masculinity/Femininity Correlations*: The *correlational* research revealed no significant correlations between farmers' slight masculinity and their intentions to use agricultural e-government, as well as trust, risk perceptions or the other cultural indexes. Therefore, this index cannot explain farmers' intentions; hence, it may not produce any direct or indirect implications on these.

All of the above findings are summarised in Figure 2 below:

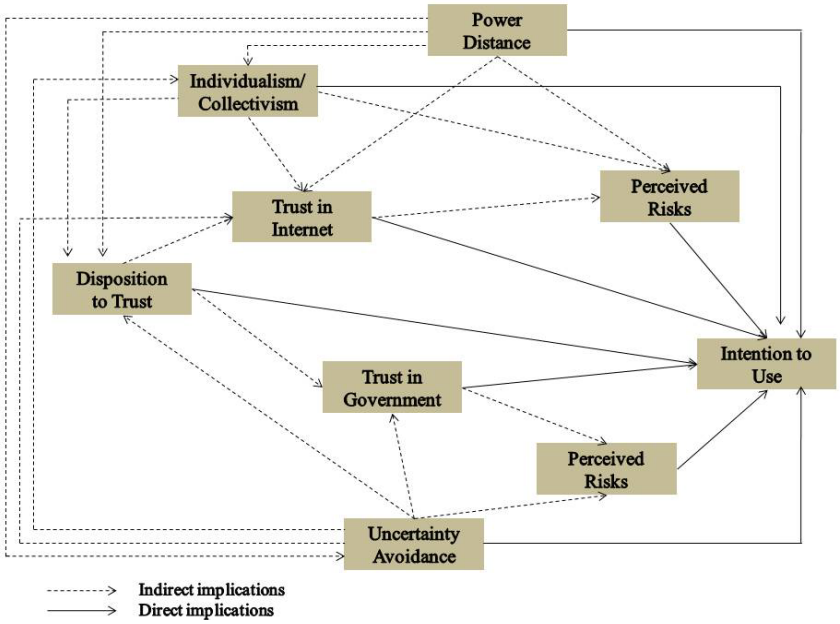

Figure 2: National cultural implications on intention to use.

National Cultural Profile and Trust Building

Lastly, low dependant relations (r = -0.223) exist between individualism/collectivism with uncertainty avoidance and power distance (r = -0.384) and between uncertainty avoidance with power distance (r = 0.243). This implies that as farmers behave more collectively, they perceive more inequalities; hence, they try more to avoid uncertain situations. Such a cultural combination may directly impact on farmers' intentions towards agricultural e-government or indirectly by affecting trust and risk perceptions.

The adversary farmers' culture towards the Internet and government should be addressed by agricultural public organisations and policy makers by developing and marketing trust-building mechanisms. Since farmers are not familiar with Internet technologies and e-government, their initial trust is required and this can engendered by institution-based and characteristic-based trust [32].

Considering the high uncertainty avoidance of farmers, system developers should constantly employ institutional structures, such as third-party seals or privacy and security policies for convincing them to use e-government [33]. But the high power distance hinders institution-based trust and the effectiveness of trust-building through the transference process and assurances [34]. Because for collectivists *proof sources* are people from *in-groups*, transferred trust is feasible only by adopting internal prevalent beliefs [35]. As individualism/collectivism determines trust-building only through procedures of *prediction* and *transference* [35] and Greek farmers have limited past experiences to predict trustworthiness [35] of such services, the key solution for agricultural public organisations to build farmers' trust is the transference process through characteristic-based trust. Policy makers and agricultural public organisations should focus on continuous two-way interplay and informative campaigns to facilitate promotion of public interest by public administration that enhance public trust [36].

Ultimately, characteristic-based trust can be a unique way for agricultural public organisations to engender farmers' trust, since now prevalent in-group beliefs will reflect collaborative culture towards the Internet and public organisations. Lastly, farmers' masculinity has no significant implications on their trust, risk perceptions, and intentions towards agricultural e-government and, hence, should not be used.

CONCLUSIONS

On the one side, research into the literature revealed a global incongruity regarding the adoption of supply-side e-government, as some countries perform well and others are laggards. The Greek supply of e-government services has not yet realised its vision although it has improved recently. On the other side of the coin, existing e-government literature that was utilised in this study was mostly based on the consistent relation between e-commerce and e-government and advantage was taken of e-commerce literature to extend consideration of trust, risk and cultural issues, from e-commerce to the e-government area [37].

Performed in this study was survey and correlational research to support the low to moderate responsibility of farmers' low trust and high risk perceptions for their intentions to use agricultural e-government. Remarkable findings are presented in the study but not significant ones related to farmers' distrust of political actors and concerns of their activity. Lastly, the study shows low to moderate significant correlations, with potential direct and indirect implications of most cultural issues on farmers' intentions to use agricultural e-government, based on which further suggestions are made for the most effective trust-building strategy.

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