

## **INVESTIGATING DIFFERENT USER PROFILES OF E-GOVERNMENT SERVICES FOR TURKEY**

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### **—Abstract —**

Development of successful e-government services partially depends on to what extent these services meet the requirements, expectations and satisfaction of the users of the system. Tackling with this problem requires a systematic classification of users based on their expectations and satisfaction so that a detailed examination of different user profiles can be accomplished. That would be of great importance especially for the countries where information and communication (IT) literacy of the users varies and the usage of e-government applications is low at the current state but has a potential to soar.

The aim of this study is to classify the users of e-government services for Turkey according to their expectations and satisfaction levels for existing services and to suggest actions for future e-government services based on the profiles of these users. Benefiting from a rigorous quantitative research methodology, different user groups of e-government services are investigated in detail. The policy makers in Turkey can utilise the findings and recommendations of the study for developing new e-government services.

**Key Words:** *e-government, e-government users, expectation and satisfaction of e-government services, user profiling and segmentation*

**JEL classification:** *M15, O38*

## 1. INTRODUCTION

Information technology (IT) has become one of the core elements of the 21<sup>st</sup> century. In parallel to advancements in the information systems (IS) and IT, electronic government (e-government) applications are developed to produce and deliver government services through the use of all information and communication technologies available (Moon, 2002). In order to provide government services seamlessly, e-government platforms which offer these services online are becoming more widely used all around the world. Advocates of e-government highlight increasing economies of scale in providing government services to citizens, improved citizen participation, and enhanced government accountability and transparency (Ahn & Bretschneider, 2011).

E-government systems have wider layers of user groups compared with other information systems. These users, for example, elderly or less educated people, may not be familiar with technology enabled systems. Then, these users are more likely to encounter problems in their interaction with e-government platforms. The digital divide is considered as a serious problem in developing countries in which IT resources and education are accessible by selected group of citizens (Rice & Katz, 2003). Therefore the diversity of user groups in terms of IS experience and skills should be taken into account when providing e-government services.

In Turkey, e-government service development and dissemination is a significant issue in the government agenda. E-Government Gateway currently provides approximately 700 services from 90 institutions to 15 million

registered users. The current target is to increase this number to 25 million, and to achieve this target, a better understanding of myriad needs and demands of different users is a must.

Due to the newly developing nature of services in Turkey and the diversity of the users accessing these services, segmentation of the users of e-government services becomes critical in terms of both academic and practical reasons. For this reason, in this paper a segmentation study based on users' expectations and satisfaction levels is conducted with the aim of suggesting actions for future e-government services. The paper is structured as follows: Section 2 presents the relevant literature on segmentation of users and why such an exercise is important in the context of e-government services. Section 3 outlines the methodology used in this research, followed by key findings in Section 4. Finally the paper ends with conclusion and discussion of future research in Section 5.

## **2. RELATED LITERATURE**

E-government initiatives changed the way government services are delivered and organized. The initial research on e-government focused on practical and technical dimensions of producing and delivery of these services online (Bertot & Jaeger, 2006). As the field has developed and the issue of presenting and making the relevant service available to users have been resolved, the needs of users of e-government services and applications have become the focal point of the way forward for research and practice.

Existing segments in population with different preference structures poses challenges to the deployment of transactional e-government services. The most pressing challenge is may be meeting the expectations of different groups of citizens (Venkatesh, et al., 2012). The first step toward delivering high quality user service is to realize that the nature of users' needs is diverse. E-government applications provide service to different classes of users (Affisco & Soliman, 2006). One of the most crucial and challenging issues facing most governments is the proficiency of citizens' usage of the Internet (Pan et al., 2006). The situation is even more challenging in the case of developing countries (Ciborra, 2005).

E-government services have created a new technological environment for both citizens and governments where different institutions and societal groups have different responses to the possibilities that these new technologies provide

(Margetts & Dunleavy, 2002). Diffusion of Innovation Theory (Roger, 1995) explains the adoption and diffusion of new innovations. Given the common application of demographics for examining the adoption of IT, their role can also be argued to be significant when examining the citizens' adoption of the e-government services (Dwivedi & Williams, 2008). The government agencies try to understand the needs of citizens and raise the level of citizen's satisfaction from services (Kim et al., 2005). One way to approach this problem could be using the existing marketing analytics tools for revealing different segments in the citizen population.

The concept of market segmentation was first introduced by Wendell Smith in 1956 (Smith, 1956). The fundamental advantage of market segmentation is a structured overview of the consumer base. One of the most frequently used statistical methods in this respect is factor analysis. It is used in order to identify "factors" that explain the correlations among a set of variables, summarize a large number of variables with a smaller number of derived variables and to determine the number of dimensions required to represent a set of variables (Minhas & Jacobs, 1996). Usually factor analysis is complemented with cluster analysis in order to classify the consumers according to the results of the preceding factor analysis. Cluster analysis makes no prior assumptions about important differences within a population (Punj & Stewart, 1983).

Motivated by the fact that there is a need to understand the preferences and the characteristics of various population segments for designing and promoting e-government services, this research proposes a standard methodology for segmentation of users, details of which is explained below.

### **3. METHODOLOGY**

The theoretical foundation of this study stems from segmentation of users within the scope of e-government. The main purpose of this study is to classify the users of e-government services in Turkey according to their expectations and satisfaction levels for existing applications and to investigate the profiles of these users with a vision of providing customized and improved services. In order to achieve this aim, a questionnaire was designed through reviewing e-government literature.

The attributes of the questionnaire are divided into six constructs: (1) socio-demographic information attributes, (2) IT skills and usage, (3) attributes related to the e-government application expectations (before and after the

usage), (4) performance, ease of use and social impact, (5) attributes related to information quality and information satisfaction, (6) attributes related to system quality and system satisfaction.

In the first part of the questionnaire, socio-demographic attributes such as age, employment status, and education level etc. were considered while the second part includes the following variables: IT literacy, internet usage (years of experience, frequency and hours spent per day), internet skill and e-government usage. The third part measures users' expectations in terms of quality of information, system and support prior to and after using the system. The fourth part of the questionnaire tries to understand the performance of the system from users' perspectives and to measure the effort to use the system as well as its social impact. In the fifth part, satisfaction levels of the users were measured with regards to the variables used in the user's expectation section. The last part of the questionnaire focuses on satisfaction from e-government services.

The present study targets the individuals who associate with the e-government services of the Turkish Republic (not necessarily only the Turkish residents or citizens). This study collects data while the individuals benefit from the e-government services through an online system, E-Government Gateway. A total number of 6,982 people participated into the survey conducted in the selected period in 2012, however, only 2605 responses were taken into consideration for analyses after a series of data pre-processing activities such exclusion of missing values and omitting repetitive responses. After the standard coding procedures necessary to perform the analyses SPSS statistical package program was utilised.

Within the scope of this study, four main analyses were carried out. First, a confirmatory factor analysis was conducted to reduce the dimensions into a manageable size. Second, factor scores obtained through the factor analysis were used for clustering the users into groups via utilising a two-step clustering procedure available in the software package. The two-step clustering method has a pre-cluster step that group the cases (or records) into many small sub-clusters and a final clustering procedure that uses a distance measure of log-likelihood to cluster the sub-clusters resulting from pre-cluster step into the desired number of clusters. Classifying the users was performed based on those factors covering the variables (a total of 51 variables) in all the constructs except attributes pertaining to socio-demographic and IT skills and usage. In order to measure those variables a one-dimensional Likert-Scaling (1-to-5

ranging from strongly disagree to strongly agree) was used. Third, descriptive analyses were performed to extract the profiles of the users. The first and the second constructs of the questionnaire were utilized to extract the profiles of each user group or cluster. Fourth, ANOVA analyses were carried out to measure whether there are statistically significant differences among the groups or cluster in terms of the socio-economic variables.

#### 4. RESULTS OF ANALYSES

With respect to descriptive statistics of the participants' socio-demographics, the statistical results indicated that majority of the participants is between the age of 21 and 40 years (72.6%). The participants come from all seven regions of Turkey, however around 42% of the participants live in Marmara region (which is in line with the population density) and only a very small percentage lives abroad. The education level of the respondents ranges from high school to postgraduate. When it is looked in detail, one can observe that more than 60% of them have at least graduate diploma. Almost 50% of the participants work for private organizations while 4.4% and 17.7% of them is student and unemployed, respectively. Finally, Two third of the survey participants are married that approximately counts for 65% of the respondents.

In order to carry out factor analysis two prior tests were carried out to ensure the suitability and acceptability of factor analysis. First, the Bartlett-Ball test was used in determining whether the same variance exists for each variable or not. As a result, the test and  $p$  values of 103,613.55 and 0.00 were obtained, respectively. Second, the KMO (Kaiser-Meyer-Oklin) analysis was performed to check if the sampling numbers and sampling objects are suitable. The evaluation result indicated that the KMO value is 0.952. Therefore, these test values imply that the data are suitable for and it is acceptable to conduct factor analysis. Principal component factor analysis (varimax-rotational factor with Kaiser normalization) was carried out on 51 variables. Initially, nice factors were obtained with a total variance of 69.33%, but after a series of repetitive steps performed to eliminate the variables (which have factor values less than 0.5), seven variables were omitted from the variable set and eight factors were extracted with a total variance of 68.51%. Therefore, final factor values were calculated using the remaining 44 variables. The name of these factors and the associated computational results of factor analysis are presented, the

corresponding factor loading for each factor is listed and the reliability of these factors is measured by Cronbach's alpha values. It can be concluded that internal consistency of each factor is rather satisfactory as they all have values equal or greater than 0.5.

After performing final factor scores the resulting eight factors were used to carry out clustering the participants. Using the two-step clustering procedure explained in the previous section the best number of clusters was found to be three. The distributions of clusters together with the labels that characterize these clusters are shown in the table below. The results showed that second and third clusters (Negatives & Positives) represents around 95% of the participants where first cluster (Neutrals) includes only a small portion of the population.

Table-1. Cluster Distribution

<i>Clusters</i>	<i>Label</i>	<i>Number of Individuals</i>	<i>Percentage (%)</i>
1	<i>Neutrals</i>	100	3.8
2	<i>Negatives</i>	1204	46.2
3	<i>Positives</i>	1301	49.9
Total		2605	100

In order to elucidate, if the clusters are identifiable or differentiable with regards to the clustering variables used (in this case the eight factors), a one-way ANOVA test was conducted for each factor and the level the differences in clusters were analysed. The first thing that needed to be checked was whether the variance was homogenous among the groups or not as an assumption for ANOVA. Levene's statistics for testing homogeneity of variances were calculated. For all factors the significance values were smaller than .05 which indicated that the variances were not homogenous and consequently the assumption for ANOVA was violated. Therefore, instead of checking ANOVA F-statistics, another test for equality of means (Brown-Forsythe) was performed for more robust examination. According to the results, the clusters could be differentiable in terms of all factors used except Factor 7 and 8.

Ensuring that the clusters obtained are identifiable based on the majority of the factors does not necessarily guarantee acceptable and convenient results for managerial implications of the classification. Therefore, further analysis is to be carried out in order to understand if there are really detectable differences

between the clusters. In order to achieve that, socio-demographics and IT skills and usage variables were taken into consideration. Profiles of each cluster based on these variables are shown in the following tables. As far as the differences in socio-economic attributes are concerned, the statistical results indicated that there are significant differences ( $p < 0.05$ ) between three clusters with regards to region, education level and employment variables. However, concerning to the age and marital status variables it may be possible to differentiate the clusters. The findings also highlight that the variable set pertaining to IT skills and usage are rather satisfactory in discriminating the clusters as for all of them the chi-square values were found to be significant. The results obtained support that the individuals of the e-government services can be clustered into three groups and both the variables used for clustering and the ones used for extracting the profiles can be considered to be discernible when examining the differences among the clusters.

## 5. CONCLUSIONS AND DISCUSSIONS FOR IMPLICATIONS

In order to classify the users of e-government services for Turkey according to their expectations and satisfaction levels for existing services and to suggest actions for development of new e-government services based on the profiles of these users, quantitative research methodology is followed through developing a questionnaire and conducting it at E-Government Gateway in Turkey. Initially, factor analysis is used to acquire the most important variable sets via ensuring valid Cronbach's alpha values. Then, cluster analysis utilising two-stage clustering algorithm is performed to obtain different groups of users that share the same level of expectation and satisfaction. A detailed investigation on the profiles of each group is carried out via relevant statistical tests such as Chi-square and ANOVA.

The results indicate that there are different user groups benefiting from e-government services and the profiles of these groups are rather different in respect of their expectation and satisfaction levels as well as their socio-demographics attributes. The different user groups can be labelled as clusters of Neutrals, Negatives and Positives:

- *Neutrals (Cluster 1)*: Not supporters of e-government services and accordingly their expectations are low, due to social influence their usage rate is high. They are mostly irrelevant and indifferent

- *Negatives (Cluster 2)*: Satisfied with neither the content and information quality provided by e-government services nor personal support, thinking that e-government makes harder the relationship with state
- *Positives (Cluster 3)*: Opposite of Cluster 1. Satisfied with either the content and information quality provided by e-government services or personal support, thinking that e-government makes easier the relationship with state

The resulting paper shares the initial results of an ongoing work which is a leading-edge contribution to the literature in the sense that users of e-government services are not considered as homogenous but segmented, and can be profiled and clustered with respect to their needs and expectations in relation with their demographic characteristics. Further research can provide detailed explanation on these clusters and their featuring characteristics. As a result, specific user-oriented suggestions for the improvement of existing services and development of new services in E-Government Gateway can be provided. These suggestions can then be extended upon other e-government services available in Turkey. Furthermore, they can be expanded to include not only online but also offline services. As a result, the offline processes can also be transformed whether they are projected onto electronic environment or not.

Although using e-government services is still totally voluntary, the government agencies are obliged to provide services either online or offline. For example, citizens have to file taxes, renew driver licences, or apply for social benefits and health services. These services are created based on citizens' needs. E-government has huge potential benefits for citizens and the public administration. Therefore, governments should transcend all sectors of society to take advantage of the huge potential benefits that e-government is capable of bringing to their citizens.

The previous Information/Knowledge Society Strategy of Turkey (2006-2011) underlined the importance of paying attention to user-oriented service provision in general. We hope, the new Strategy that is being prepared will pay attention to specific user profiles, encouraging to move towards tailored service provision for different user needs, expectations and demands. As a result, Turkish e-government services can also increase their rankings in the international comparisons and become a good role model for other developing countries.

## ACKNOWLEDGMENT

This work has initially benefited from Hala Al-Khatip's PhD work in Brunel University. We would like to thank Dr Asım Balcı from Ankara Development Agency, Dr Ahmet Kaplan from Tubitak, Turkey for their support and TÜRKSAT e-government services staff for collection of data in the course of this research.

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