

Comparative Analysis of the e-Municipality Applications in Turkey: The Case of Western Black Sea Region *

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ABSTRACT

In this study, it was aimed to put forward the presence and types of online e-Municipality services by analyzing the web sites of seven province and 21 district municipalities in the Western Black Sea Region. In order to determine the district municipalities, the address-based population registration system of 2010 was used and three most populated districts were chosen from each province. e-Municipality services stated on the web sites of the municipalities were coded as 0=Available or 1=Not Available on the assessment criteria form. According to the results, only three of the seven province municipalities in Western Black Sea Region provide e-Municipality services. According to the grading, in terms of the availability of online transactions among the seven municipalities which provide e-Municipality services, Municipality of Düzce takes the first place with 14 points and a 0.58 coefficient value and Municipality of Kastamonu is in the second place with 12 points and a 0.50 coefficient value.

Key Words: *Adequacy Indicator, e-Municipality, Local Governments, Western Black Sea Region*

JEL Classification: *H83, Y80*

Türkiye’de E-Belediye Uygulamalarının Karşılaştırmalı Analizi: Batı Karadeniz Bölgesi Örneği

ÖZET

Bu çalışmada, Batı Karadeniz Bölgesi’ndeki yedi il ve 21 ilçe belediyesinin web siteleri incelenerek çevrimiçi e-belediye hizmetlerinin varlığı ve ne tür hizmet verdiklerinin karşılaştırmalı olarak ortaya konulması amaçlanmıştır. Araştırmaya konu olan ilçe belediyeleri belirlenirken 2010 yılı adrese dayalı nüfus sisteminden yararlanılmış ve her ilden nüfusu en fazla olan 3’er ilçe seçilmiştir. Belediyelerin web sitelerindeki e-belediye hizmetleri değerlendirme ölçütleri formuna 0=yok ya da 1=var şeklinde işlenmiştir. Araştırma sonuçlarına göre; Batı Karadeniz Bölgesi’ndeki yedi il belediyesinin üçünde e-belediye hizmeti bulunmaktadır. E-belediye hizmeti veren yedi belediye içinde çevrimiçi yapılabilen işlemler açısından yapılan puanlamaya göre; Düzce Belediyesi 14 puan ve 0.58 katsayı değeri ile ilk sırada, Kastamonu Belediyesi ise 12 puan ve 0.50 katsayı ile ikinci sırada yer almıştır.

Anahtar Kelimeler: *Yeterlilik Göstergesi, e-Belediye, Yerel Yönetimler, Batı K. Bölgesi*

JEL Sınıflandırması: *H83, Y80*

* This study was adopted from the proceeding which was presented at 9th International Conference on Knowledge, Economy and Management in Sarajevo in 2011 in Turkish.

Introduction

The e-State Project in Turkey was launched as a Prime Ministry Circular, dated February 23, 2003. In the 9th Seven-Year Development Plan, which covers 2007 and 2013, it was aimed, within the scope of e-State services, to strengthen the present infrastructures for local governments to provide more efficient and rapid service (item 705), to establish standards concerning the services which will be provided online (item 710), and to enable information sharing (item 710) (SPO, 2006: 97). Before that date, municipalities were already providing e-Municipality services by using different infrastructures by their own means. Since this became a government policy, as of this date, more productive, efficient and common e-Municipality services are being provided. The e-State Portal, which was published in 2008, gathered the 22 e-State services, which were provided through different public institutions' websites. The rate of population who benefited from these services became 8.4% of the total population of the country (SPO, 2009: 41). Further, in 2009, the number of services which integrated into the e-State portal increased to 139 and the number of visitors to these services reached 571,113 (GDLA, 2011: 1).

e-Municipality services are all being provided through the internet infrastructure. The first internet-like application started in 1962 in the USA with the establishment of ARPANET system, which enables two computers to communicate with each other. While the number of computers that were connected to this system was only 213 in 1981, the number of internet users reached 16 million in 1997 (MNE, 2006: 14). Turkey's acquaintance with the internet started when METU (Middle East Technical University) connected to the global internet network in 1993 (Çakır and Topçu, 2005: 7). According to 2010 data, the number of broadband internet subscribers was only 7.6 million in Turkey (Güngör *et al*, 2010: 51). A research conducted in 2010 by Mediascope, an international research institution, revealed that approximately 26.5 million people (34.5% of the general population) are using internet in Turkey (Mediascope, 2010).

In many researches conducted in Turkey, the definition of "e-Municipality" generally covers all kinds of announcements, which are statically published on the websites of the municipalities. However, in some international publications, only downloadable forms, e-management properties, the current status of management operations, online tax payments and online citizen participation are classified under e-Municipality (e-State) services. In this research, e-Municipality defined as a dynamic database services such as payments and debt inquiry that can be conducted online through the websites of municipalities (Miranda *et al*, 2009: 431). In some researches the definition of e-Municipality has been described as "an application which is in connection with the internal and external units of the institution" (Erdal, 2002: 169) and "the basis of providing a service and becoming transparent" (Henden and Henden, 2005:56). E-Municipality applications such as city guides, real estate, signboards and sanitation notices, and payments have been among the most commonly used

services for citizens. As these applications provide a 7/24 service, citizens save time and the municipalities save resources, and are able to provide a more efficient and rapid service.

The extent of e-Municipality applications in any local government is parallel with the usage level of the information technologies of that country. According to the “Global Information Technology Report 2009-2010” Sweden, Singapore and Denmark took their places in the top three (5.65, 5.64 and 5.54 points, respectively) to the network readiness index rankings, Turkey took the 69th place with 3.68 points. As of 2006, Turkey’s ranking in the evaluation of information technology readiness decreased from 48th to 69th (in 2007 to 52nd, in 2008 to 55th, in 2009 to 61st place). In terms of internet usage, Iceland, Sweden and Holland take their place in the top three (90, 87 and 86 people out of 100, respectively), but Turkey takes the 53rd place (34 people out of 100) (Dutta and Mia, 2010:33). Apart from the private sector in Turkey, so far two important projects have been carried out which constitute the basis of e-Municipality services. These are “Local Governments Information Base Project”, which was completed between 2002 and 2003, and Research Project for Developing Training Materials for Local Governments (Yerel Yönetimler İçin Eğitim Malzemesi Geliştirme Araştırma Projesi-YerelNET)”, which was launched in 1999 and is still an ongoing project (YerelNET, 2011). In recent years, Turkey has succeeded to develop some e-Municipality software projects. An e-Municipality project developed by the Istanbul Water and Sewerage Administration (İSKİ), which is affiliated with the Istanbul Metropolitan Municipality, awarded as first in a competition conducted in the USA in 2007 under the “Geographical Information Systems-State” category (IWSA, 2011).

In Turkey, while only one municipality was providing e-Municipality service in 2001, it was determined to increase this number to 188 by 2009. (Çoruh, 2009:3). Currently some of the pioneering municipalities in the application of e-Municipality are Yalova, Kadıköy, İstanbul, Ankara Municipalities (İmir, 2006:56).

I. Purpose – Methodology and Research Limitations

A. Purpose

Rapid improvements in information technologies have enabled many transactions and services to be performed online. As a result, e-municipality applications which enable fast and efficient conduct for public services that require extensive bureaucratic procedures have become widespread. This study aims to put forward the existence and types of e-Municipality services by a comparative analysis of websites of 28 municipalities which located in Kastamonu, Karabük, Bartın, Zonguldak, Bolu, Sinop and Düzce provinces.

B. Methodology

The e-Municipality services of the aforementioned provinces and district municipalities in the Western Black Sea Region (WBR) are evaluated through a “content analysis” method. Content analysis is to gather similar data within the scope of specific concepts and themes and arrange these so as the readers to

understand (Yıldırım and Şimşek, 2008: 227). By means of this method, the data gathered is analyzed thoroughly, the themes and extents which are not clear are revealed. Content analysis is frequently being used for evaluation of web sites in recent years. This method has been used by writers such as Akdere (2011), Handzic *et. al* (2011), Aktel (2009), Miranda et al (2009), Esen and Takım (2011) and Candemir and Kazançoğlu (2009). The seven province municipalities, which constituted the research population, are sampled using the “full count” method. While determining the aforementioned district municipalities, 2010 address-based population system was used and the three most populated districts were chosen from each province. E-municipality services on the websites of 21 district and seven province (a total of 28) municipalities are recorded as 0=Not Available and 1=Available to the assessment criteria form. In this form, e-Municipality services are evaluated under 10 different major topics and the services under each group are graded and then a total score is calculated. The studies of Tunca and Özaltın (2005), Aktel (2009), Candemir and Kazançoğlu (2009) and Miranda et al (2009) were examined to help with the preparation of the assessment criteria form (Aktel, 2009: 227). For the comparison of sufficient indications of the e-Municipality services of provinces and district municipalities, the ‘Mann-Whitney U test’ was used which is appropriate for nonparametric data (Eymen, 2007:153). For the calculation of the sufficient indications the following formula was used.

$$Y = T / n * F$$

(1)

Variables used in the formula are as the follows:

Y= Sufficiency indicator of e-Municipality service

T= Calculated sufficiency point

n= Number of the samples

F= Number of the evaluated e-service

C. Research Limitations

WBR is the area where the writers live in. Therefore it is chosen as a research area with the aim of guiding local governments. As the websites of the aforementioned municipalities were visited on 26 - 29 April 2011[†], the research results represented only the status of that time. Moreover, in terms of municipalities, only 21 district and seven province municipalities in the WBR were selected. In addition, research area is limited to three districts with the highest population (a total of 21) from each provinces as the total number of the district municipalities in the provinces is 47. As for the e-Municipality service criteria, the present study was limited to the services provided by the analyzed municipalities.

[†] Due to presenting the previous version of this study at 9th International Conference on Knowledge, Economy and Management in May 2011, the date is limited between 26 and 29 April 2011.

II. Literature Review

In Turkey and in the world, especially from the beginning of 2000, a large number of articles and theses were written and published on the topic of e-State and e-Municipality. Some of these studies to May 2011 are summarized in Table 1. These publications are composed of studies which the websites of municipalities are analyzed, and e-Municipality services in the world and in Turkey are compared and institutional evaluations are made.

Table 1: Important researches on e-Municipality

Writer (s)	Publication Type	Methodology	Important findings
Yıldırım and Öner, 2004	Article	Theoretical	e-Municipality applications in Turkey and in the world are summarized.
Çoruh, 2009	Article	Survey-based	93% of analyzed 973 municipalities have web sites, 188 have e-Municipality services.
Bengsghir et al 2006	Article	Survey-based	It has been seen that only 2 out of analyzed 70 municipalities use Geographical Information System for their municipality services.
Candemir and Kazançoğlu 2009	Bulletin	Content analysis	24 web sites of the municipalities in the coastline of Aegean Region are evaluated according to the content analysis method and it is seen that 69.6% of these provide no e-Municipality services.
Aktel, 2009	Article	Content analysis	In 25% of the analyzed 75 province municipalities' web sites, online marketplace prizes are provided and in 52% of these, e-payment is available.
Miranda et al, 2009	Article	Content analysis	84 European municipalities are analyzed, provided e-Municipality services are classified and 44,71% of these provide tax payments, 50,6% provide administrative processings and 38,82% provide downloadable forms.
Gandia and Archidona, 2007	Article	Content analysis	130 municipalities from Spain are analyzed. The web sites are evaluated by calculating the index points with Web Quality Model which was specially developed and in the end it is seen that Spanish municipalities' web sites are generally used as a portal for promotional purposes or bureaucratic procedures.
Ulusoy and Çobanoğulları, 2011	Article	Content analysis	The concept, purpose, characteristics, advantages and fields of use of e-municipality had been discussed and practices in the world had been exemplified. Also the practices of e-municipality in Turkey, the problems that were confronted and what could be done had been discussed.

Pektaş, 2011	Article	Content analysis	This study examines the usage of information and communication technologies for local public services. Moreover, the importance of e-municipality and its problems in practice has been investigated. The latest improvements in e-municipality have been evaluated by using case studies.
Nergiz and Saraçbaşı, 2011	Article	Content analysis	This study aims to stress the role of e-municipal in democratic governance. Accordingly, the services, municipalities render named “access to public information and transparency”, “online participation and counseling”, “voting and local representation” and other sub titles is handled on the basis of the municipalities associated with Mediterranean Municipalities Federation (68 municipalities).
Almazan and Garcia, 2011	Article	Survey-based	In this study, local government portals in Mexico are being researched whether they are improved or not in terms of more interaction, participation and collaboration between public enterprises, non-profit institutions, organizations, business enterprises, individuals and other social actors. 2400 municipal governments in 32 states in Mexico have been divided into two as rural governments and rural municipalities according to information processing technology use levels and an online survey has been conducted with respective questionnaires.
Acılar, 2012	Article	Theoretical	In this study, the web site and e-municipality applications of Bilecik Municipality which try to provide service to the citizens with a more limited financial and human resources compared to the urban municipalities are being analyzed.
Navarroa, <i>et al.</i> , 2012	Article	Survey-based	In this study, the importance of information processing technology in developing e-state and civic engagement in 179 Spanish official town websites is researched. The research based on the National Statistics and it was carried out to 397 municipal governments (total of 8.108 municipalities) with population over 20,000 inhabitants.

III. Findings

A. The existence of web sites and e-Municipality services

According to the research results, three out of the seven province municipalities in the WBR of Turkey provide an e-Municipality service. However, Zonguldak, Bartın, Bolu and Sinop do not provide any e-Municipality

services. As for the 21 district municipalities, only 4 of them have an e-Municipality service. Mudurnu and Göynük district municipalities do not provide any web site services (Table 2).

Table 2: Web site and e-Municipality data of municipalities in WBR

	Web Site				E-Municipality			
	Unavailable		Available		Unavailable		Available	
	F	%	F	%	F	%	F	%
Province								
Municipalities	0	0,00	7	100	4	57,14	3	42,86
District								
Municipalities	2	9,52	19	90,48	17	81	4	19

B. Online e-Municipality Services

In Table 3, information about municipalities which provide online e-municipality services is given. The most commonly provided services in the province municipalities were debt payment, debt inquiry, real estate, announcements and advertisements, environmental declarations, fair value queries, online white table and password generating with four points. However, there was no district municipalities that provide real estate, announcements and advertisements, environmental declarations, fair value queries, online reconstruction and online information services. Among the district municipalities, there was no service item with full points. Considering the fact that district

Table 3: Online e-Municipality services of WBR Municipalities

ONLINE e-MUNICIPALITY SERVICES	Province Municipality	District Municipality	TOTAL
	n=3	n=4	n=7
	Frequency	Frequency	Frequency
1.Dept payment	3	2	5
2.Dept inquiry	3	2	6
3.Real estate, announcement and advertisement etc. inquiry	3	2	7
4.Fair value query	3	2	7
5.Registration number query	2	2	6
6.Real estate, announcement and advertisement etc. declaration	0	0	0
7.Construction cost	2	1	5
8.File tracking	1	1	3
9.Environment tax/ tariff displaying	2	2	6
10.Garbage collection hours	1	0	1

11.Council agenda	1	1	2
12.Address information system	1	0	1
13.E-zoning	0	0	0
14. Abrasion rate query	1	0	1
15.Licence interrogation	1	0	1
16.Detailed interrogation	0	1	2
17.White table	3	2	7
18.Tender query/displaying	0	1	2
19.Document management	1	0	1
20.Parliament – council acts displaying	1	1	2
21.Marriage application query	1	0	1
22.Creating password	3	1	6
23.e-Information	0	1	2
24. Cemetery information system	0	1	2
T=Total Points	33	23	56
Y=Sufficiency Indicator	0.47	0.28	0.37

municipalities cannot find financial aid, this situation is clearly explainable. However, debt payment, debt inquiry, real estate, announcements, advertisements and environmental declarations, fair value queries and white table operations were shown to be the most commonly provided services in the WBR with seven out of nine points. The sufficiency indicator parameter (Y) which indicates the quality of online e-municipality services that the province and district municipalities provide has been determined as 0.47 and 0.28 respectively.

According to the results of the e-State (local) survey which covers 2.999 municipalities, while the average rate of municipalities which can electronically provide services such as request/application forms, information requests and feedback is 13%, and it is 19% in the WBR (GDLA, 2011: 40). It is observed that the number of municipalities which provide tax and charge payments via credit card is 182 (6.82%) across Turkey (GDLA, 2011: 40) and 7 (19.44%) for this research.

Sufficient indicators of the seven municipalities that provide online e-Municipality services are given in Table 4. According to the results, in terms of online e-Municipality services, Düzce takes first place out of all municipalities with 0.58 points. Kastamonu takes second place with 0.29 points. Although it is a province municipality, Karabük takes sixth place with 0.29 points. In terms of central district population, while the most populated province, Düzce takes first place, Karabük, which is the second most populated, takes sixth place and the third most populated, Karadeniz Ereğli takes third place.

Table 4: Sufficiency Indicator of Online e-Municipality services of WBR Municipalities*

MUNICIPALITIES	Central District	Total Points	Sufficiency Indicator
	Population		
1.DÜZCE	129.118	14	0.58
2.KASTAMONU	91.012	12	0.50
3.Karadeniz Ereğli	97.500	11	0.46
4. Ayancık	12.346	9	0.38
5.Taşköprü	16.551	8	0.33
6.KARABÜK	108.710	7	0.29
7.Gerede	24.142	2	0.08

*Municipalities written in capitals are the province municipalities.

C. Security Assessment

In order to benefit from e-Municipality services, citizens must primarily have a registration number given by the municipality. If they already have a registration number, it is possible for them to find out their identity number. The registration number and the password which the citizen creates herself/himself must be used for payments and queries regarding personal information. However, no membership is needed for queries regarding non-personal information. The security parameters which are based on e-Municipal services were created by the factors observed during the membership process in the municipalities surveyed. According to this, the sufficiency parameters are calculated as 0.50 in province municipalities, 0.29 in district municipalities and 0.38 in municipalities-wide. Security measures of the analyzed municipalities in terms of parameters can be accepted as low (Table 5).

Table 5: Security measures of the municipalities which provide e-Municipality service

SECURITY MEASURES	Province Municipality	District Municipality	TOTAL
	n=3	n=4	n=7
1.128 bit SSL	3	2	5
2.Use policy	2	2	4
3.Picture item for first record	3	2	5
4.Control of record information	2	2	4
5.Photograph item in login	1	0	1
6.Logging in with electronic signature	1	0	1
7.Reminder question	2	2	4
T=Total points	14	10	24

Sufficient indicators of the nine municipalities in terms of security parameters, which provide an e-Municipality service, are given in Table 6.

According to the results, Kastamonu and Karadeniz Ereğli municipalities take first place with a 0.86 sufficiency grade, and Ayancık Municipality is in last place with a 0.00 indicator point. In terms of the central district population, while the most populated province, Düzce, takes the third place, Karabük, which is the second most populated, takes fourth place and Karadeniz Ereğli, the third most populated, takes second place.

Table 6: Security indicators of online e-Municipality services of WBR*

MUNICIPALITIES	Central District	Total	Sufficiency
1.KASTAMONU	91.012	6	0,86
2.Karadeniz Ereğli	97.500	6	0,86
3.DÜZCE	129.118	4	0,57
4.KARABÜK	108.710	2	0,29
5.Gerede	24.142	1	0,14
6.Taşköprü	16.551	1	0,14
7.Ayancık	12.346	0	0,00

* Municipalities written in capitals are the province municipalities.

D. Other parameters

Other than the basic e-Municipality services mentioned in the previous sections, the availabilities of disability support, the right to be a user for foreign citizens and some mobile services were also analyzed and the calculated points are given in the Table 7. Accordingly, the sufficiency parameters of the province and district municipalities and total services are calculated as 0.25, 0.14 and 0.19, respectively. According to the municipality ranking, Düzce takes first place with 0.43 points, Taşköprü and Ayancık Municipalities are in the last place with 0.00 points.

Table 7: Evaluation of other e-Municipality services of WBR Municipalities

OTHER SERVICES	Province	District	TOTAL
1.Disability support	0	0	0
2. Entrance for foreign people	1	0	1
3. Query without membership	3	2	5
4.Registration code test	1	3	4
5.Information via mobile phones	0	0	0
6. Debt notifications via SMS	1	0	1
7. Citizen participation channel	0	0	0
T=Total point	6	5	11
Y=Sufficiency indicator	0,25	0,14	0,19

E. General Evaluation

As a result of the evaluation of the sufficiency criteria calculated according to the average points of total online e-Municipality services, security measures and other services provided by WBR municipalities' e-Municipality

services, Kastamonu Municipality takes first place with 0.548 sufficiency points. Then, Karadeniz Ereğli district follows with 0.534 points. While Karabük takes the last place with 0.240 points among the province municipalities, Gerede which takes the last place with 0.123 points among the districts and in the general order. In terms of the central district population, Düzce, which is the most populated, takes third place, Karabük, which is the second, takes fourth and Karadeniz Ereğli, which is third, takes second place (Table 8).

Table 8: General evaluation of e-Municipality services of WBR Municipalities*

MUNICIPALITIES	Central District	Average Sufficiency Indicator
1.KASTAMONU	91.012	0,548
2.Kdz Ereğli	97.500	0,534
3.DÜZCE	129.118	0,528
4.KARABÜK	108.710	0,240
5.Taşköprü	16.551	0,159
6.Ayancık	12.346	0,125
7.Gerede	24.142	0,123

* Municipalities written in capitals are the province municipalities

In order to evaluate whether there is a difference between the e-Municipality services in Black Sea Region provinces and district municipalities, sufficiency points calculated as a result of the analysis were tested with the Mann-Whitney U test at a 5% significance level and no significant difference was determined in terms of the features in each group (Table 9). According to the results, whether it is a province or a district municipality is not important in order to provide e-Municipality services to its citizens, on the contrary, planning, resource allocation and vision is much more crucial for this kind of service.

Table 9: Test results of e-Municipality services of WBR province and district municipalities*

FACTORS (n=9)	p value
1. Online e-Municipality services	.213*
2.Security	.304*
3.Other services	.306*
4.All features	.184*

* not significant at %5 level ($p > .05$)

Conclusions and Suggestions

Rapid improvements in information technology have made our daily lives easier and made it possible for many tasks and services to be done faster and more

efficiently with computers and computer-based systems. State institutions and organizations enable services to become faster, more efficient and transparent for the citizens by advantage of this system. Within this context, e-State and e-Municipality services started to become popular. As a result of this research, it is seen that four province municipalities out of seven in the WBR do not provide e-Municipality services. As a result, it can be understood that 49.25% of the total population of province municipalities, 62.30% of district municipalities and 54.23% of total population of the region are deprived of e-Municipality services. In the sufficiency indicator ordering of e-Municipality services of seven municipalities that provide e-Municipality service, Kastamonu Municipality takes the first place with 0.548 points and Gerede Municipality takes the last place with 0.123 points.

It was determined that e-Municipality software programs used in municipalities are supplied by five different companies and that the municipalities purchase software which is sold as a module package, which is relevant to their budget limits and priorities.

The following suggestions should be considered in order to benefit from local services more efficiently in order to have an increase in e-Municipality service quality;

- ✓ e-Municipality software should be prepared as an integrated and modular package by General Directorate of Local Administrations or by another relevant governmental institution as a central project. By these means, the wasting of resources will be prevented and e-Municipality services will be standardized.
- ✓ Ultimate security precautions should be taken for applications which enable online payments via credit cards and citizens should be informed regarding this matter.
- ✓ The investments of small district municipalities which have difficulty in obtaining finances required for e-Municipality investments should be supported.
- ✓ Staff should be trained regarding efficient use of e-Municipality services.
- ✓ Online declarations stating which services are not among e-Municipality services which form the present research area should be commenced.

No heading is present regarding the e-Municipality services in the 9th Seven-Year Development Plan. Only items 704 and 711 under the title of the dissemination and activation of e-State applications, enabling information security, disseminating the use of e-signatures in public and disseminating the local governments' services directed at electronic application are foreseen. In this respect, it is not possible to compare the research results with government policies and objectives. It will be useful for institutions to be responsible for planning government policies and investments to set goals based on digital data about e-Municipality services in terms of a better interpretation of scientific research results.

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