Chapter 1

Online Services in Metropolitan Municipalities as a Smart City and Governance Tool: The Case of Turkey[1]

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Abstract

The subject of the research is to determine the number of online (e-municipality) applications, which is a basic sub-component of smart governance, of the metropolitan municipality, which is the most effective local government unit in Turkey, by grouping them within itself, and to determine the number of applications compared to other municipalities. The main purpose of the study is to identify local online applications in Turkey, to group them, to determine how many are applied specifically to metropolitan municipalities and to create score tables among metropolitan municipalities. Thus, it will be possible to compare the success scores of metropolitan municipalities by determining which online services they provide and which ones are insufficient. With the comparisons made, the supply and demand ratios of online services and applications will also be revealed. The scope of the research is 30 metropolitan municipalities in Turkey. In the research, the corporate web pages of the metropolitan municipalities were analyzed by the scanning (content analysis) method. In this context, the corporate web pages of all metropolitan municipalities were examined in detail between 15.03.2022 and 15.04.2022 and online service types were determined by using the data obtained, grouped within themselves and score measurements

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were made. The existing online services of metropolitan municipalities were evaluated in general and by comparing them with each other. The data obtained through the research were grouped within themselves, and the types of services in each group were listed separately in 11 separate tables for all municipalities. Finally, an evaluation and comparison was made over the grand total of 11 score tables. At the end of the study, it has been determined that the average success rate of 30 metropolitan municipalities in Turkey is 71.99%. In addition, it was seen that the most successful metropolitan municipalities were Ankara BB (91.39%), Istanbul BB (90.57%) and İzmir BB (89.34%).

1. Introduction

The government as the central administration body and local governments perform various public services needed by the people within the geographical area, they are responsible for. The number, scope, type, content, presentation, and priorities of public services vary according to time and place of residence. This situation causes variability in the definition and content of the concept of public service.

A generally accepted definition of public service that covers all disciplines has not been developed in the literature. However, public service can be defined in a narrow scope as "*activities carried out separately or jointly by a public legal entity(ies) (public administrations and/or their affiliated institutions/units) or private legal entities under the supervision and inspection of a public legal entity for a public interest purpose*" (Mecek et.al., 2015:483). In a slightly broader context, public service can be defined as follows (Mecek et al., 2015:483);

> *"It is the activities aimed at offering a general and common requirement (need) of essential and indispensable quality, which is accepted as the satisfaction of the public interest or interest, to the society in a regular, continuous, and stable manner when needed, by the legislator and/or the political organs based on the authority established by the legislator. These activities are carried out by the state, local administrations, or other public legal entities and/or private legal entities under the supervision and supervision of a public legal entity."*

Public services can be classified in various ways according to the sector providing the service, the legal regime they are subject to, the freedom of execution, the way people benefit, the geographical area and subjects of the service. According to the geographical area in which the service is carried out, public services are broadly analyzed in four groups as *"universal", "national",*

"regional" and *"local"*. A public service can be classified as; universal if it crosses country borders such as electronic communication; national if it is carried out at the whole country level, such as health, justice; regional if services that cannot reach the country level, but exceed the provincial level, such as regional support and development; local if services offered to people living within the borders of a certain province, town and village (Yıldırım, 2012:199-200). However, when considered in terms of central administrations and local administrations, this distinction is usually made in binary rather than quaternary. In simpler terms, public services are divided into two, narrowly "*national*" and "*local*", according to the geographical area in which the service is carried out.

National public services are determined by law or an equivalent legal norm in order to meet the requirements needed at the national level. Such public services are carried out by the government, which is the central administration body, or by public institutions established under the central administration. From the point of view of Turkey, services such as justice, national security, intercity transportation, national education are included in this scope. Local public services are public activities that meet common needs at the local level. Common services at the local level are generally carried out by local governments. In Turkey, services such as zoning, urban transportation, solid waste collection, environmental cleaning and urban infrastructure are included in this scope. Public services at national and local level can also be performed by private sector legal entities under the supervision and inspection of the relevant public administration (central - local governments).

In the laws regulating the establishment, operation and organizational structure of municipalities, metropolitan municipalities (MM), special provincial administrations and villages, which are local government units in Turkey, the public services that local governments should or can do are separately and clearly stated. While some of these are obligatory, some are left to the initiative of local governments according to need, financial power and priority. However, the powers and responsibilities of local governments are not limited to these. In Turkey, all "local" and "common" public services that do not fall under the duty and authority of other administrations or institutions by the constitution and laws or are not prohibited by legal norms can be performed by local administrations (Mecek et al., 2015:485).

While performing public services, local governments try to balance between the demands of the people and their financial capabilities in terms of "priority" and "service quality". The current political atmosphere

and expectations also have a significant impact. For this reason, the type, content, scope and quality of public services offered in every city are not at the same level. The political competition in the country contributes to increasing the type and number of services provided by local governments on the one hand, and the quality and efficiency on the other.

Municipalities are the most effective local government units in Turkey. Among the municipalities, the most effective local government unit in terms of financial opportunities, authorities and the number of people they serve is the metropolitan municipalities. As of 2022, 30 of the 81 provinces in Turkey have metropolitan status. Metropolitan municipalities with a population of at least 750 000 people serve wide geographical areas.

In this study, smart city and governance practices in metropolitan municipalities, which are the settlement areas where technological changes and transformations are experienced the fastest and most effectively, will be analyzed. Changes and developments in communication technologies have created new platforms, and everything that is processed and shared here has become data. These data are in a large mass ready to be used, researched and examined today (Özkaynar et al., 2019: 152). In this context, data were collected from the corporate websites of metropolitan municipalities. Obtained data were analyzed over scores. The existing e-services of metropolitan municipalities were evaluated in general and by comparing them with each other. The data were collected between 15.03.2022 and 15.04.2022.

2. Online Services as a Smart Governance Tool in Municipalities

Technological developments and service transformations in the field of public administration also show themselves in the field of local governments. The use of technology in city management is increasing day by day in order to realize environmentally compatible, sustainable, efficient and effective public service provision. Thus, the concept of "smart city" in terms of city management and technology harmony has reached its most up-to-date version.

Rapid urbanization in cities and the accompanying rapid population growth bring many problems around the world. Large residential areas open the door to ecological, social and economic risks that cause important problems such as disasters, global warming, excessive natural resource consumption, environmental degradation. Sustainable policy and urban planning strategies are needed in order to minimize these risks and to transform cities into more attractive and livable places. The concept of smart

city stands out in terms of meeting these needs, producing forward-looking solutions and creating a more efficient and livable city area by making improvements over the existing situation.

In addition to the term "*smart city*", terms such as, "*intelligent city*", "*digital city*", "*informatic city*", "*technocity*", "*knowledge city*", "*virtual/ internet city*", "*wired city*", "*talented city*", "*environmental city*" "*eco city*" and "*sustainable city*" are also used in the academic literature as synonymous or closely related to this concept. (European Parliament, 2014:22; Türkiye Bilişim Vakfı, 2016:11). However, these terms are not equivalents of the smart city, but are closely related concepts (Mecek, 2021:435). In order not to confuse the concept of smart city with other concepts and to present its content and scope in the most accurate way, a general definition is needed.

There is no common and generally accepted definition of the smart city concept covering all periods, disciplines, and perspectives. The main reason for this is that the smart city phenomenon is in a state of continuous development and continues to renew itself in line with the developing technology and transforming demands. In addition, since the smart city has many technical and social components, it is also examined and developed by different disciplines. Each discipline imposes new meanings and contents on the concept according to its field of study, scientific purposes, application techniques and scientific tools. However, there is an obligation to put forward a definition considering the current time, technological dimension and needs, although there is no fully agreed definition of smart city. In this context, smart cities can be defined in general and briefly as follows (Mecek, 2021:436);

> "*They are systems and applications that bring together human, physical and digital elements holistically with the help of information and communication technologies in the management of the city and in service provision in order to provide the services required for the city in a rational and sustainable way and to increase the living comfort of the city residents*"

Smart cities are cities that enable the local people who live in cities to participate in the management effectively, and that facilitate and enrich people's lives by producing solutions to the problems seen in cities (Yılmaz and Telsaç, 2021: 141). Governance-based cities are cities that can display a common attitude in solving the problems of the people who have vision in the fields of people, economy, mobility, environment, life and governance, which constitute the main dimensions of the city (Giffer, 2007). To define "Smart city" with a more comprehensive approach; It performs the services

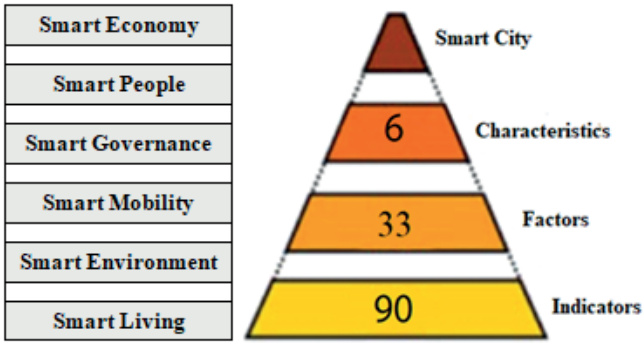
required for the city such as security, transportation, communication, distribution, infrastructure, energy, justice, education, sports, health, trade, social life, management in the most sustainable, safe, fair, equal, ecological and economic way. It aims to increase the living comfort and welfare levels of the people living in the city. Information and communication technologies are assisted in the data collection, processing, evaluation and renewal activities of the city's planning, construction, management, and service delivery activities. It is the place, system, process, and applications that urban human elements, physical tools (space, machinery, equipment, etc.) and digital systems (big data, internet of things, cloud computing, camera, sensors, smart devices, social media, etc.) are brought together in an effective, efficient, harmonious, participatory, innovative, versatile and holistic manner (Macak, 2021:436).

Smart cities are formed because of bringing together human (human/community) elements, physical tools and digital systems in a rational management structure with the help of information and communication technologies. From this point of view, although the transformation of a classical city into a smart city depends on human, technological (physical-digital) and institutional factors/elements, some main and sub-components are needed as the indicators of this transformation. These components are dimensions that show the transformation and success levels of smart cities. Various studies have been put forward to determine these main and sub-dimensions (components). The evaluations made by Giffinger (2007) and later by Cohen (2012) are the most fundamental and priority studies in this field.

Giffinger (2007) focused on the main components of a smart city in his project, which he wanted to make a "smart city rating" by comparing medium-sized European cities. As a result of the research of Giffinger (2007:10-13), smart cities were divided into 6 main components; "Smart Life", "Smart People", "Smart Mobility (Transportation)", "Smart Environment", "Smart Governance", and "Smart Economy". In addition, he divided these six basic components into a total of 33 sub-components[4], including group of with 7 and 4. Again, he defined smart cities with 90 explanatory components.

4 Giffinger et al identified a total of 33 components. However, since they could not obtain sufficient data on the components of "transformation ability" and "political strategies and perspectives" in their studies, they could not use these components in city rankings (Giffinger, 2007:11).

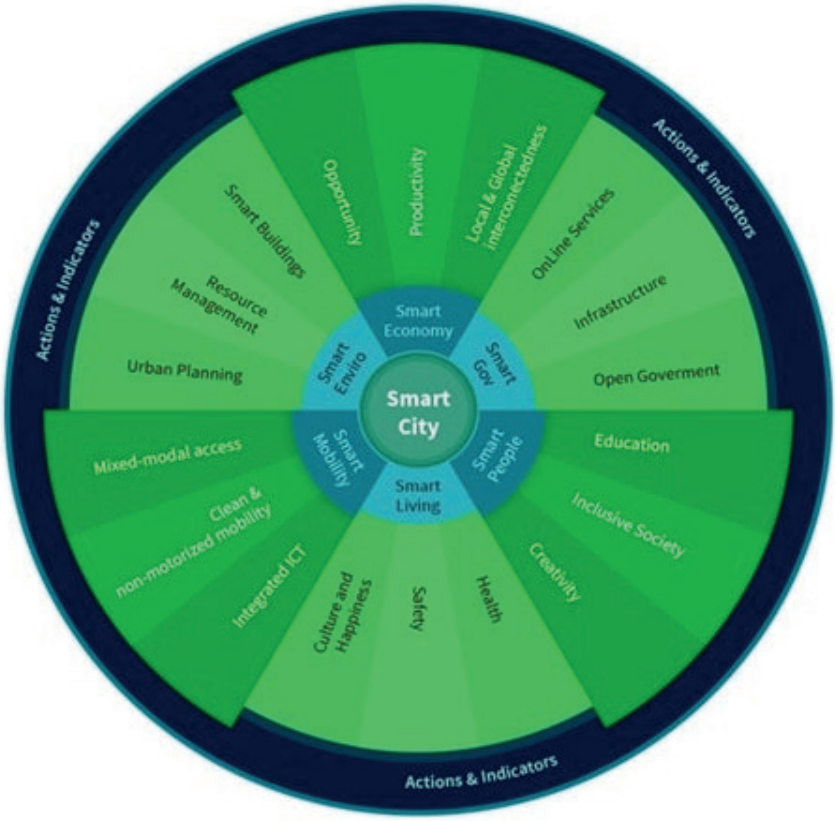
Figure 1. Smart City Main Components and Sub-Explanatory Component Distribution



Source: Giffinger, 2007:11 (Fig.1 + Fig.2).

Cohen (2012) systematized the main components of the smart city determined by Giffinger by combining them on a circular wheel. With this model, which he called the Smart Cities Wheel, he integrated the 6 main components that make up the smart city and each sub-components affecting these components into groups of 3 and integrated them into each other. The sub-components, which were determined as 33 by Giffinger, were tripled by Cohen (2012) and re-systematized as a sub-gear in the form of 18 sub-components (6x3).

Figure 2. Smart City Wheel (Basic – Sub-Components Relationship)



Source: Cohen, 2012.

Smart city components, which Cohen (2012) took as an example from Giffinger and systematized by dividing them into sub-components, were accepted in a report[5] published by the European Union (EU) Parliament. Although the 6 basic components related to smart cities have been widely accepted in the academic literature and national/international research, it is seen that different approaches in terms of number and content have been put forward in terms of both basic components, sub-components and explanatory components from time to time. For example, smart cities were built on 5 components (*smart governance, smart economy, smart human capital indicators, smart living, smart environment*) by Lombardi et al. (2012:139) and on 8 components (*smart infrastructure, smart transportation, smart environment, smart service, smart governance, smart citizen, smart life, smart*

5 Smart Cities Council, 2014:18.

economy) by Anthopoulos (2017:8-12). The basic classifications made by Giffinger (2007) and Cohen (2012) will be taken as a basis in the study, since it is more generally and widely accepted and is the data base of many other studies. In this context, smart cities are divided into 6 main components, including *"Smart Life (Quality of Life)", "Smart Society (Citizens/People): Social and Human Capital", "Smart Mobility (Transport – Mobility): Transport and ICT", "Smart Environment (Sustainability of the Environment)", "Smart Management (s)m (Participation)",* and *"Smart Economy (Competitiveness)".*

2.1. Conceptual and Theoretical "Smart Governance" and its Subcomponents

The concept of governance[6], which is obtained by adding the suffix "interesting (reciprocity)" to the word management (Okçu, 2012:11), can be defined in the most general sense as follows (Mecek and Kocakula, 2019:196);

> *"Administrative and political decision-making authority on social, political and economic issues at local, regional or national level cannot be left to the monopoly of the public sector (especially state administration-centered). It includes the central administration (state), local administrations (special provincial administrations, municipalities, villages), public institutions, private sector persons, non-governmental organizations (NGOs) and other service recipients, who are directly or indirectly affected in the process of introducing, implementing, supervising, and maintaining these policies. It is a participatory, pluralistic and multi-centered management model in which all stakeholders are used mutually, together and in interaction with each other in a political balance."*

The phenomenon of governance highlights the action of "participation" in all processes such as city-specific planning, decision-making, construction, implementation, supervision, transformation and management. To put it simply, all social groups and legal entities affected by the city management act jointly in the management of the city and in the construction of its future, together and in interaction with each other, and each of them contributes/

6 *Government: tries to establish and maintain the balance of the lowest cost and the most appropriate benefit on the outputs (goods, services, facts, decisions, policies, etc.) to be obtained with the existing resources (labor, entrepreneur, raw material, fixture, capital, information, place, time etc.) of the people who have come together for certain purposes, regardless of the structural (organizational) and functional (functional) type, whose founding principle is the economy in historical conditions.It is a dynamic process in which multiple power balances affect, and the actions (activities) within this process and the organic structure and system in which these are carried out in cooperation, in an effective, efficient, harmonious and coordinated manner (Mecek and Kocakula, 2020:1419).*

participates in the process. In the ancient Greek and Roman periods, a certain part of the society was participating in the city administration by coming together in various squares and structures called "agora" and "forum" and expressing their views. Today, it has become a priority not only for an elitist segment, but also for all individuals and social groups to be interested in the problems of the city they live in and to participate in order to contribute to the solution. However, since it is not possible to gather people in a physical agora, arena or forum, this unity is ensured on digital networks and platforms, thereby reducing the barriers to participation of people (Mecek, 2021: 440; Kocaoğlu 2016: 302-303; Kocaoğlu and Şahnagil, 2021: 36-37).

What makes management and governance "smart", in other words what makes cities "smart", is actually the production of policies and practices that establish a context between technology and space (Göçoğlu, 2021:398). To illustrate it more clearly; it is the intensive use of information and communication technologies (ICT) embedded in web pages or independent mobile applications in the realization of city administration (management) activities, while ensuring democratic participation (Pareira et al., 2018:14; Yılmaz and Mecek, 2021). In the 2000s, *"intelligent governance"*, the foundation of which was laid with concepts such as *"digital governance*", "*digital age governance*" and "*e-governance*", essentially includes moving these concepts to a higher level and harmonizing them with each other more intensively (Göçoğlu, 2021:404-408). Intelligent governance has a more advanced form than e-governance in terms of content. While people's use of electronic applications to benefit from public services and ensure urban participation briefly reveals e-governance; The storage and processing of big data and communication and coordination between devices and even objects reveal smart governance. This situation reveals the "technological infrastructure" used in smart city governance and the "*online services (e-municipal applications)*" implemented with this infrastructure as basic sub-components. Of course, "*participation*", which are essential elements of governance, and "*transparency*", which is mandatory for optimal participation, also appear as other important basic components.

Table 1. Sub-Components of the Intelligent Governance Core Component

	Giffinger (2007) Components	**Cohen (2012) Smart City Wheel**
Sub-Components	Participation in decision making processes	Open government
	Public and social services	Infrastructure
	Transparent governance	Online services
	Political strategy and perspectives	

Source: Mecek, 2021:440.

Smart city governance; It envisages the use of all resources, primarily human and energy, in a controlled, efficient and sustainable manner in the production of human-oriented local service policies, in the determination of strategies and in the provision of local services. Smart devices and online applications and management services are offered in a much more participatory and effective manner with all stakeholders both in policy and implementation processes. All kinds of places, machinery, equipment, vehicles and physical equipment that exist in the city and are connected with smart city systems are part of this element. Internet of Things (IoT), artificial intelligence (AI), robotic logistics solutions (e.g. transporter robots, conveyors), industrial robots, machine-to-machine communication (M2M), smart mobile devices, 3D printers, cameras, sensors, semiconductors, blockchain, software programs and systems for industrial manufacturers, and advanced technological tools such as edge computing and cloud computing constitute the building blocks of the smart city system (Yılmaz and Mecek, 2021:121). In order to realize smart governance in practice, online systems such as electronic document management system (edms), e-signature, city guide, e-municipality, mobile-municipality, SMS-municipality, data/portal based management systems, e-legislation, e-assembly, e-decision, e-survey, e-democracy, e-audit, e-zoning, e-tax, live support, mobile business tracking system, smart door QR system, virtual switchboard have been implemented (Mecek, 2021:440-441).

2.2. Digital Transformation and Online (E-Municipality) Services in Municipalities

The first identified example of smart city applications in Turkey was implemented in Yalova with the "*Information Valley Project*" in the early 2000s (Alkan, 2015: 73). Afterwards, it has found application area in many

provincial and district municipalities, especially in Kocaeli, Ankara and Eskişehir. These initiatives are also supported by the central government. In fact, units and centers for this purpose are established within the central administration management structure, and strategic plans are prepared. For example, "*Smart Cities and Geographical Technologies Department*" was established within the structure of the Ministry of Environment and Urbanization. In addition, with the 10th Development Plan covering the period of 2014-2018, smart cities started to be included in the development plans. Smart city studies within local governments are mainly carried out by "*Computer Departments*". Smart city services are implemented by creating sub-directorates such as electronics - communication, software, geographic information systems (GIS) within the relevant departments. A department on smart cities has not yet been established in Turkey. Only a unit called "*Smart Cities Directorate*" has been established within the Information Processing Department within the Istanbul Metropolitan Municipality (Mecek, 2021: 446-447).

Today, the scope of smart city services is quite wide. Many platforms, systems, applications, devices, etc. are used in order to realize the six basic components of smart cities in the most effective way. Among these, the most common and accessible ones are online applications. While online applications used by the central administration (state) are generally called "*e-government*"; online applications used by local governments (municipalities) are also called "*e-municipality*".

Interactive applications such as e-government and e-municipality are not only a form of public services that provide prestige and reduce costs, but it is also one of the basic requirements of a professional, rational, transparent, auditable, participatory and effective public administration approach (Mecek, 2017:1816). While the concepts of e-government and e-municipality are considered by some authors from a very broad perspective, they are seen as "*a magic wand that solves all problems*" (Al and Alodalı, 2008: 1206) or "*a savior*" (İnce, 2001:21). In some cases, it has been confined to a very narrow scope by some authors. Similar to the "e-government" practices carried out within the scope of the central administration (at the national level), the "e-municipality" practices carried out in terms of municipalities (at the local level) can be defined as follows (Mecek, 2017:11826-1827);

> *"It is a set of policies, models, processes, systems and practices created with a human-oriented service delivery approach, which has the effect of increasing individual participation and democracy culture. It also has the following characters: It is aimed to provide urban*

> *public services in a much faster, easier, accessible, holistic, effective, efficient, modern, equal, transparent, auditable, accountable, direct, safe, high quality and uninterrupted manner with less bureaucracy and resource use. It is based on the processing, transmission, storage, querying, evaluation, control and management of digital data such as text, sound and image in an open network environment of municipalities with individuals and institutions or in closed network environments accessed by a limited number of users. In this context, it offers its users the opportunity to make online (real-time) transactions such as information, collection, application, reservation, exchange of services and goods, promotion, forming public opinion, establishing two-way communication, auditing, preference, approval, documentation, etc. in the digital environment by using information and communication technologies."*

With the digital transformation experienced with the digital age, local governments, like the central government, had to renew themselves against technological developments and changing service demands. In Turkey, e-municipality applications have been implemented by almost all provincial and district municipalities. However, the number, content, service quality and effectiveness of these practices vary significantly between municipalities. The most comprehensive and effective delivery of these services can be realized by metropolitan municipalities (30 of them) and some developed district municipalities. There are also differences between metropolitan municipalities in terms of number, content, service quality and efficiency.

3. Analysis of Online (E-Municipality) Service Practices in Metropolitan Municipalities in Turkeye

Although "*online applications*", that is, "*e-municipality*" applications, which are the digital application components of smart governance in Turkey, have some differences in terms of number, type, content and service quality, these services are modernized and tried to be made identical over time. Even a very limited number of them are included in the national e-government platform. However, almost all the studies in this area are carried out independently by the municipalities.

While some of the e-municipal services are prepared by the sub-units of the relevant municipality, a significant part of them is provided through service procurement from the private sector. These applications are transformed over time according to the changing demand and service concept via the technological developments. The e-municipality service,

which was implemented by one municipality due to political competition, is being used by other municipalities in a short time. However, the lack of certain standards in institutional presentation tools, especially municipal web pages and application modules, causes differences in terms of the famousness, prevalence and usage areas of these applications. Again, factors such as citizens' service expectations, cultural differences, service priorities, financial power differences, education level, technology use level, promotion, etc. also significantly affect the supply and demand for e-municipal services.

3.1. Subject, Purpose and Importance of the Research

The subject of the research is to determine the number and implementation rates of (e-municipality) applications which is the fundamental sub-component of smart governance, of 30 metropolitan municipalities as the most effective local government units in Turkey, by grouping them within themselves and comparing with other municipalities. The main purpose of the study is to identify local online applications in Turkey, to group them, to determine how many are applied specifically to metropolitan municipalities and to create score tables among metropolitan municipalities. Thus, it will be possible to compare the success scores of metropolitan municipalities by determining which online services they provide, and which ones are insufficient. Through the comparisons, the supply and demand ratios of online services and applications will also be revealed.

3.2. Literature Review Related to the Research

The rising significance of e-Municipality in parallel with the developments in information and communication technologies (ICT) has led to many theoretical and empirical studies on this subject. Some of the empirical studies on e-Government/e-Municipality applications, which are becoming more and more widespread in the academic literature, are carried out by content analysis on websites, and some by survey method. However, there are also studies that apply both methods (Aktel, 2009:225-226). Studies on e-Municipality and municipal web pages are generally clustered into three main groups. The first one of these is the efficiency, effectiveness, ease of use, accessibility, appearance, transparency, democracy, participation, etc. of the municipality web pages. The second group of studies, on the other hand, deals with the subjective approaches of managers, personnel, their perceptions, knowledge and satisfaction levels on citizens, non-governmental organizations, public/private sector organizations and social groups, service receiving rates, opinions, etc., which are the stakeholders of municipality web pages and e-Municipalism applications. The second group of studies,

on the other hand, deals with the subjective approaches of municipality web pages and e-Municipalism applications on their stakeholders, their level of knowledge and satisfaction, service receiving rates, opinions, etc. The stakeholders here include managers, staff, citizens, non-governmental organizations, public/private sector organization and community groups. The third group of studies examines the technical aspects of municipal web pages such as infrastructure, hardware, access speed, software, design and security (Mecek, 2018:2324). The scope of the study is limited to the first group.

Empirical studies conducted in Turkey on content analysis of municipal web pages can also be evaluated in three main groups. The first of these is individual website analytics. In other words, it includes the examination of any municipality web page and e-Municipal applications by researchers according to certain criteria. The second group of studies is on the simultaneous comparative analysis of the websites of more than one municipality at the local level. The third group of empirical studies consists of the larger-scale version of the second group, that is, more comprehensive studies covering Turkey in general or regional or a few provinces (Mecek, 2018: 2324-2325). There are studies conducted in Turkey at a substantial level in all three groups. However, in terms of the scope of the study, all of them will not be included, and only large-scale studies that have been carried out extensively throughout Turkey will be briefly mentioned.

Yıldız (1999) comparatively examined the populations of 29 provincial and district municipalities in terms of whether they have contact information and financial information data of municipalities and corporate managers. Yıldırım and Öner (2004) gave comparative information on the websites of Ankara, İstanbul, İzmir, Antalya and Yalova municipalities from Turkey and general internet usage, e-government and e-municipal services in America, the UK, New Zealand, Canada, Finland, Netherlands, Ireland, Spain, Australia and Brazil.

In the study conducted by Parlak and Sobacı (2012), functionality scores of 16 metropolitan municipalities were calculated by comparing "information services", "communication services" and "online services" with three main headings and a total of fourteen different criteria. In the study by Aktel (2009), in order to measure the functionality of the websites of the provincial municipalities and the level of the e-government (e-municipality) applications of the municipalities, using the content analysis method, 75 provincial municipality websites were examined based on 15 main criteria and their sub-criteria, and their qualifications were determined.

In the study conducted by Candemir and Savaşçı Kazançoğlu (2009), the websites of 22 municipalities selected among the member municipalities of the Union of Coastal Aegean District Municipalities were examined and the related web pages were evaluated comparatively with the help of 68 questions (criteria) in terms of design and content. In the study conducted by Özüpek (2010), effectiveness analysis was conducted on the web pages of 16 metropolitan municipalities that existed before the 2012 law amendment, according to 7 criteria under the title of "recognition tools and methods in municipalities" and 12 criteria under the title of "promotion activities in municipalities".

E-municipality applications were analyzed by examining the web pages of Istanbul Metropolitan Municipality, Denizli Municipality, Gaziantep Metropolitan Municipality, Kayseri Metropolitan Municipality and Antakya Municipality by Genco (2010). The websites and e-municipality practices of 2949 municipalities existing as of 2010 were investigated by Kabakuş (2010).

In the study conducted by Alodalı et al. (2012), e-municipality applications of 6 provincial municipalities (metropolitan municipalities were not examined) in the Mediterranean Region as of 2012 were divided into 3 categories as "information and document delivery services", "communication services" and "online transaction services". The main criteria and 14 sub-criteria were determined, and an evaluation was made on the institutional web page of the provincial municipalities. Negiz and Saraçbaşı (2012) compared the web pages of 67 municipalities in the provinces of Antalya, Isparta, Muğla, Burdur, which are also members of the Union of Mediterranean Municipalities, and the web pages of the non-metropolitan Burdur, Hatay, Isparta, Kahramanmaraş, Kilis and Osmaniye provincial municipalities in the Mediterranean region. The web pages are examined in terms of the presence/absence of 14 basic data under the main headings of "access to public information and transparency" and "information and document delivery services", "communication services" and "online transaction services".

In the study conducted by Yaman et al. (2013), 7 provincial municipalities in the region and the web pages of the three most populated district municipalities in the region were examined according to the 2010 address-based population registration system (ABPRS). The e-municipal services on a total of 28 municipal web pages were compared under 10 main headings. In the study conducted by Kabakuş (2014), the corporate websites of 519 district municipalities affiliated to 30 metropolitan municipalities in Turkey

were examined. The efficiency of the provinces with metropolitan status was investigated by taking into account the ownership of the relevant municipality's web site and e-municipality applications (online transactions and online collection opportunities). In the study conducted by Şat (2016), the websites of 30 metropolitan municipalities in Turkey were evaluated based on a total of 106 criteria under the main headings of "Security and User Privacy", "Usability and Accessibility", "Content", "Service Delivery" and "Participation".

3.3. Methodology of the Research

There are 81 provinces in Turkey. 30 of them are in the metropolitan position and the others are in the general provincial position. Each province also has sub-districts. In each province and district, there are municipal administrations as well as central administration units. In addition, municipalities were established at the town level in non-metropolitan provinces. Smart city services in general and e-municipal services require a certain power and experience in terms of financial, technological and human resources. For this reason, there are differences in practice between cities. These differences cause difficulties in the attainment of certain standards and the dissemination of services. In the study, a constraint was constituted at the scale of metropolitan municipalities in order to contribute to the approximate formation of implementation standards, to minimize differences and to determine good practice examples in a more comprehensive way. For this reason, the scope of the research is limited to 30 metropolitan municipalities in Turkey.

In the research, corporate web pages of metropolitan municipalities were analyzed by scanning (content analysis) method. In this context, the corporate web pages of all metropolitan municipalities were examined in detail between the dates of 15.03.2022 and 15.04.2022 and using the data obtained, online service types were determined, grouped within themselves and score measurements were made. Comparative functionality analysis method was used in the study. The existing online services of metropolitan municipalities were evaluated in general as well as by comparing them with each other.

The data obtained through the research were grouped within themselves and the types of services in each group were listed separately in 11 separate tables for all municipalities. Municipalities with the specified online application were given "2 points", those who partially owned "1 point" and those who did not have any "0 points" were given. Then, the total score

received by the relevant municipality for each group was calculated. Thus, the success status of the municipalities regarding the relevant online service type and the success rate against other municipalities were evaluated. In the last table, an evaluation and comparison were made over the grand total of 11 score tables.

Table 2. Basic Information of Metropolitan Municipalities

Metropolitan Munucipality	Population	Area (km^2)	Population Density (Number of People per km^2)	Total Number of Districts	Web Address
Adana	2.258.718	13.844	160	15	https://www.adana.bel.tr/
Ankara	5.663.322	24.521	215	25	https://www.ankara.bel.tr/
Antalya	2.548.308	20.177	115	19	https://www.antalya.bel.tr/
Aydın	1.119.084	8.116	138	17	https://aydin.bel.tr/
Balıkesir	1.240.285	14.583	85	20	https://www.balikesir.bel.tr/
Bursa	3.101.833	10.811	287	17	https://www.bursa.bel.tr/
Denizli	1.046.698	12.134	86	19	https://www.denizli.bel.tr/
Diyarbakır	2.230.431	15.272	118	19	https://www.diyarbakir.bel.tr/
Erzurum	758.279	25.005	30	20	https://www.erzurum.bel.tr/
Eskişehir	888.828	13.960	64	14	https://www.eskisehir.bel.tr/
Gaziantep	2.101.157	6.803	309	9	https://www.gaziantep.bel.tr/tr
Hatay	1.659.320	5.600	296	15	https://hatay.bel.tr/
İstanbul	15.462.452	5.461	2831	39	https://www.ibb.istanbul
İzmir	4.394.694	11.891	369,5	30	https://www.izmir.bel.tr/
Kahramanmaraş	1.154.102	14.519	79	11	https://kahramanmaras.bel.tr/
Kayseri	1.421.455	16.969	84	16	https://www.kayseri.bel.tr/
Kocaeli	1.997.258	3.397	588	12	https://www.kocaeli.bel.tr/
Konya	2.250.020	40.841	55	31	https://www.konya.bel.tr/
Malatya	806.156	12.259	66	13	https://www.malatya.bel.tr/
Manisa	1.450.616	13.340	109	17	https://www.manisa.bel.tr/
Mardin	854.716	8.779	97	10	http://www.mardin.bel.tr/
Mersin	1.868.757	16.010	117	13	https://www.mersin.bel.tr/
Muğla	1.000.773	12.655	79	13	https://www.mugla.bel.tr/
Ordu	761.400	5.861	130	19	https://www.ordu.bel.tr/
Sakarya	1.042.649	4.823	216	16	https://www.sakarya.bel.tr/
Samsun	1.356.079	9.725	149	17	https://www.samsun.bel.tr/
Şanlıurfa	2.115.256	19.242	110	13	https://www.sanliurfa.bel.tr/
Tekirdağ	1.081.065	6.190	175	11	https://www.tekirdag.bel.tr/
Trabzon	811.901	4.628	175	18	https://www.trabzon.bel.tr/
Van	1.149.342	20.921	55	13	https://van.bel.tr/

The information about the metropolitan municipalities, which are the subject of the research and for which data is collected, are shown in Table.2. The number of people living in metropolitan municipalities (population),

the total area of the city, the number of people per km2 (population density), the number of districts served and the corporate web addresses where the data are collected are given in detail in the table.

3.6. Findings of the Research

Within the scope of the research, e-municipality services provided by metropolitan municipalities were evaluated by dividing them into 11 diverse groups according to their similarity. These groups are *"Online Applications Related to E-Reconstruction, E-Urbanism and E-License Services", "Online Applications Related to Transportation Services", "Online Applications Related to City Life and Environmental Services", "Online Applications Related to Public Relations, Volunteering and Participation Services", respectively. Online Applications", "Online Applications Related to E-Information and E-Access Services", "Online Applications within the Scope of Promotion/Information Services Regarding Activities and Applications", "Online Applications Related to E-Learning Services and Educational Materials", "Culture and Art Services Related Online Applications", "Human Resources, Economic and Financial Services Online Applications", "Social Assistance and Funeral Services Online Applications" and "Human Health and Stray Animal Services Online Applications"* respectively.

Table 3. Online Applications Related to E-Reconstruction, E-Urbanism and E-License Services

Metropolitan Munucipality	E-Map and Location Applications	Zoning Inquiry Applications	Urban Transformation Operations Applications	Expropriation Services Applications	Zoning Plan and Hanger Notices Applications	Applications Related to Water-Sewer Works	Illegal Excavation and Fault Notification Applications	Freight Transport Operations Application	Excavation and Route Operations Applications	Pipe, Welding and Control Operations Applications	Licensed Excavation Areas Information and Service Applications	Project Investment Monitoring Systems	Engineer, Architect and Surveillance Registration Information Systems	TOTAL SCORE
Adana	2	1	2	1	1	2	1	0	0	0	0	2	0	**12**/26
Ankara	2	2	2	2	2	2	2	2	2	2	2	2	0	**24**/26
Antalya	2	2	1	2	2	2	1	1	1	1	1	2	0	**18**/26
Aydın	2	2	1	2	2	2	1	2	2	0	2	2	0	**20**/26
Balıkesir	2	2	1	2	2	2	1	1	1	1	1	2	0	**18**/26
Bursa	2	2	1	2	2	2	2	0	2	1	2	1	2	**21**/26
Denizli	2	2	1	1	2	2	1	1	1	1	1	2	0	**17**/26
Diyarbakır	2	2	2	1	2	2	2	1	2	2	1	2	0	**21**/26

Erzurum	2	2	1	1	2	2	2	1	1	1	1	2	0	**18**/26
Eskişehir	2	2	2	1	2	2	2	1	2	1	2	1	0	**20**/26
Gaziantep	2	2	2	2	2	2	1	1	1	1	1	1	0	**18**/26
Hatay	2	0	1	1	0	2	0	1	1	1	0	1	0	**10**/26
İstanbul	2	2	2	2	2	2	2	1	2	2	2	2	1	**24**/26
İzmir	2	2	2	2	2	2	1	1	2	2	2	2	1	**23**/26
Kahraman-maraş	2	2	1	2	2	2	2	0	1	2	1	2	0	**19**/26
Kayseri	2	2	2	2	2	2	1	1	2	1	2	2	1	**22**/26
Kocaeli	2	2	2	2	2	2	1	0	2	1	2	2	0	**20**/26
Konya	2	2	2	2	2	2	1	1	2	2	2	2	0	**22**/26
Malatya	2	1	1	2	2	2	0	0	1	0	0	2	0	**13**/26
Manisa	2	2	1	2	2	2	2	0	2	1	2	2	0	**20**/26
Mardin	1	1	1	1	1	2	1	0	1	1	0	1	0	**11**/26
Mersin	1	1	0	2	1	1	1	1	1	0	1	1	0	**11**/26
Muğla	1	1	1	1	1	1	1	0	1	0	1	1	0	**10**/26
Ordu	2	1	1	2	1	1	1	0	1	0	1	1	2	**14**/26
Sakarya	2	1	1	2	1	1	0	0	0	0	0	1	0	**9**/26
Samsun	2	2	2	2	1	2	0	0	0	1	0	2	0	**14**/26
Şanlıurfa	2	2	2	2	1	2	1	0	2	2	2	2	0	**20**/26
Tekirdağ	2	2	2	2	2	2	2	2	1	2	1	2	0	**22**/26
Trabzon	2	1	1	2	1	2	0	0	2	1	2	1	0	**15**/26
Van	2	2	1	2	2	2	0	0	1	0	1	2	0	**15**/26
TOTAL	**56**/60	**50**/60	**42**/60	**52**/60	**49**/60	**56**/60	**33**/60	**19**/60	**40**/60	**30**/60	**36**/60	**50**/60	7/60	

There are 13 online applications in the list of "*Online Applications Related to E-Reconstruction, E-Urbanism and E-License Services"* in Table 3. Ankara MM and Istanbul MM got the highest score with "*24 points*" out of a total of *"26 full scores"*, and İzmir MM got the second highest score with "*23 points*". While the lowest score is in Sakarya MM with "*9 points*", the second lowest score is in Hatay MM and Muğla MM with "*10 points*". The average score of metropolitan municipalities in this group was calculated as "***17.37 points***". According to Table 3, the online application with the highest score was determined to be *"E-Map and Location Applications"* with "*60 points*". The lowest scoring online application in this category is the "*Engineer, Architect and Surveillance Registration Information System*" with "*7 points*". It was determined that the online applications in this group have an average score of "***40.31*** points".

Table 4. Online Applications Related to Transportation Services

Metropolitan Municipality	Traffic Tracking Systems	Transportation Tracking and Control Services Applications	Parking Systems	Bus Route and Transportation Applications	E-Taxi Applications	Smart Bicycle Apps	Alternative Transportation (Tramway, Ferry, Metro, etc.) Services Applications	Transportation Services Applications for the Disabled	C Plate Compliance Portal	S Plate (Green Belt) Eligibility Portal	Dolmus Vehicles Eligibility Portal	UKOME Commercial License Plate Management System	TOTAL SCORE
Adana	1	2	0	2	0	1	2	2	0	2	2	2	**16**/24
Ankara	2	2	2	2	1	2	2	2	2	2	2	2	**23**/24
Antalya	1	2	1	2	0	2	2	2	1	0	0	1	**14**/24
Aydın	1	2	1	2	0	0	2	1	0	0	1	1	**11**/24
Balıkesir	1	2	1	2	0	2	2	1	0	1	0	1	**13**/24
Bursa	2	2	1	2	0	2	2	2	2	2	1	2	**20**/24
Denizli	1	2	2	2	0	2	1	2	2	2	2	2	**20**/24
Diyarbakır	1	2	1	2	0	2	1	2	1	1	1	1	**15**/24
Erzurum	1	2	1	2	0	0	1	2	1	1	1	2	**14**/24
Eskişehir	2	2	1	2	0	0	2	2	1	1	1	1	**15**/24
Gaziantep	0	2	2	2	0	2	2	2	0	1	0	1	**14**/24
Hatay	0	2	0	2	0	1	1	1	1	1	0	2	**11**/24
İstanbul	2	2	2	2	2	2	2	2	1	1	1	2	**21**/24
İzmir	2	2	2	2	2	2	2	2	2	1	1	2	**22**/24
Kahraman-maraş	1	2	1	2	0	1	1	2	0	2	0	2	**14**/24
Kayseri	2	2	2	2	0	2	2	2	0	1	0	2	**17**/24
Kocaeli	1	2	2	2	0	2	2	2	2	2	2	2	**21**/24
Konya	2	2	2	2	0	2	2	2	1	0	1	2	**18**/24
Malatya	2	2	1	2	0	2	2	1	0	1	0	2	**15**/24
Manisa	2	2	2	2	0	2	2	2	0	0	0	2	**16**/24
Mardin	1	1	1	1	0	1	0	1	0	0	1	1	**8**/24
Mersin	1	2	0	2	0	2	2	1	1	1	1	1	**14**/24
Muğla	1	1	1	1	0	2	1	1	0	0	0	2	**10**/24
Ordu	1	1	1	2	0	2	1	1	0	1	1	1	**12**/24
Sakarya	0	2	0	2	0	2	0	1	0	0	0	1	**8**/24
Samsun	1	2	2	2	0	2	2	2	1	0	0	2	**16**/24
Şanlıurfa	2	1	0	2	0	2	2	2	0	1	0	2	**14**/24
Tekirdağ	1	1	1	2	0	1	2	2	0	1	0	2	**13**/24
Trabzon	0	2	2	2	0	2	2	1	0	1	0	2	**14**/24
Van	0	2	2	2	0	0	2	1	1	1	0	2	**13**/24
TOTAL	**35**/60	**55**/60	**37**/60	**58**/60	**5**/60	**47**/60	**49**/60	**49**/60	**20**/60	**28**/60	**20**/60	**50**/60	

There are 12 online applications in the "*Online Applications Related to Transportation Services*" list in Table 4. Ankara MM got the highest score with "*23 points*" out of a total of "*24 full scores*", and İzmir MM got the second highest score with "*22 points*". While the lowest score is "8 points" in Mardin MM and Sakarya MMs, the second lowest score is in Muğla MM with "*10 points*". The average score of metropolitan municipalities in this group was calculated as "***15.07 points***". According to Table 4, it was determined that the online application with the highest score was "*Bus Route and Transportation Applications*" with "*58 points*". It is seen that the lowest scoring online application in this category is "*E-Taxi Applications*" with "*5 points*". It was determined that the online applications in this group have an average score of "*37.75* points".

Table 5. Online Applications Related to City Life and Environmental Services

Metropolitan Municipality	Weather Notification App	Environmental Pollution Notification Applications	Solid - Liquid Waste Treatment Applications	Medical Waste Application Applications	Dam Water Filling Ratios Applications	Carbon Footprint Calculator Applications	Water Footprint Calculator Apps	Other E-EIA Applications	Smart City Card Applications	TOTAL SCORE
Adana	0	0	1	0	2	0	0	1	2	**6**/18
Ankara	1	2	2	2	2	2	2	2	2	**17**/18
Antalya	2	1	1	0	1	0	0	1	2	**8**/18
Aydın	0	1	1	1	1	0	0	1	2	**7**/18
Balıkesir	0	2	2	2	2	2	0	2	2	**14**/18
Bursa	1	1	2	2	2	1	1	2	2	**14**/18
Denizli	1	1	1	1	0	2	0	1	2	**9**/18
Diyarbakır	1	1	1	1	0	0	0	1	2	**7**/18
Erzurum	2	1	1	1	0	0	0	1	2	**8**/18
Eskişehir	0	2	1	1	1	0	0	1	2	**8**/18
Gaziantep	0	1	1	1	1	1	0	2	2	**9**/18
Hatay	2	1	1	1	1	1	0	2	2	**11**/18
İstanbul	2	2	2	2	2	2	2	2	2	**18**/18
İzmir	2	2	2	2	2	1	0	2	2	**15**/18
Kahramanmaraş	0	1	1	1	2	1	0	2	2	**10**/18
Kayseri	0	1	1	1	0	2	2	2	2	**11**/18
Kocaeli	2	2	1	2	0	2	0	2	2	**13**/18
Konya	2	2	1	2	2	1	1	2	2	**15**/18

Malatya	0	1	1	1	0	0	0	1	2	**6**/18
Manisa	0	1	2	2	2	1	0	1	2	**11**/18
Mardin	1	0	1	0	0	0	0	0	1	**3**/18
Mersin	0	1	1	0	0	0	0	1	2	**5**/18
Muğla	0	1	1	1	1	2	0	1	1	**8**/18
Ordu	1	1	1	1	0	0	0	0	2	**6**/18
Sakarya	0	1	1	1	0	0	0	1	2	**6**/18
Samsun	0	1	2	2	2	2	0	2	2	**13**/18
Şanlıurfa	0	1	2	0	1	0	0	2	2	**8**/18
Tekirdağ	0	2	2	1	2	0	0	2	2	**11**/18
Trabzon	0	1	2	0	0	1	0	2	2	**8**/18
Van	0	2	1	2	0	0	0	2	2	**9**/18
TOTAL	**20**/60	**37**/60	**40**/60	**34**/60	**29**/60	**24**/60	**8**/60	**44**/60	**58**/60	

There are 9 online applications in the list of *"Online Applications Related to City Life and Environmental Services"* in Table 5. Out of a total of "*18 full scores*", Istanbul MM achieved the highest score with "*18 points*" and Ankara MM achieved the second highest score with "*17 points*". While the lowest score is in Mardin MM with "*3 points*", the second lowest score is in Mersin MM with "*5 points*". The average score of metropolitan municipalities in this group was calculated as "***9.87 points***". According to Table 5, it was determined that the online application with the highest score was "*Smart CityCard Applications*" with "*58 points*". It is seen that the lowest scoring online application in this category is "*Water Footprint Calculator Applications*" with "*8 points*". It was determined that the online applications in this group have an average score of "*32.67 points*".

Table 6. Online Applications Related to Public Relations, Volunteering and Participation Services

Metropolitan Munucipality	Document Application/Tracking System	EBYS and E-Document Verification Services	Solution Center Application/ Tracking System	Information, Request and Complaint System	Service Satisfaction Evaluation System	Service Guides and Workflow Information Services	Legislation Information System	VOLUNTEER Applications	I Have a Project/Idea Applications	Contest Application and Information Applications	E-Questionnaire et al. Data Collection Applications	TOTAL SCORE
Adana	2	2	2	2	2	2	2	2	2	2	2	**22**/22
Ankara	2	2	2	2	2	2	2	2	1	2	2	**21**/22
Antalya	2	2	2	2	0	2	2	1	2	2	2	**19**/22
Aydın	2	2	2	2	2	2	2	1	0	2	2	**19**/22
Balıkesir	2	2	2	2	1	2	2	1	1	2	2	**19**/22
Bursa	2	2	2	2	2	2	2	2	1	2	2	**21**/22
Denizli	2	2	2	2	1	2	2	1	1	2	1	**18**/22
Diyarbakır	1	1	1	1	1	2	2	1	1	2	1	**14**/22
Erzurum	2	2	2	2	1	2	2	1	1	1	1	**17**/22
Eskişehir	2	1	2	2	1	2	2	1	1	1	1	**16**/22
Gaziantep	2	2	2	2	0	2	2	1	1	2	0	**16**/22
Hatay	2	2	2	2	0	2	2	1	1	2	0	**16**/22
İstanbul	2	2	2	2	2	2	2	2	2	2	2	**22**/22
İzmir	2	2	2	2	2	2	2	2	1	2	2	**21**/22
Kahramanmaraş	2	2	2	2	1	2	2	2	2	2	2	**21**/22
Kayseri	2	2	2	2	1	2	2	1	2	2	2	**20**/22
Kocaeli	2	2	2	2	1	2	2	1	2	2	1	**19**/22
Konya	2	2	2	2	2	2	2	2	2	2	2	**22**/22
Malatya	2	2	2	2	2	2	2	1	1	2	2	**20**/22
Manisa	2	2	2	2	2	2	2	1	1	2	2	**20**/22
Mardin	2	2	1	2	1	1	1	1	1	1	0	**13**/22
Mersin	2	2	1	2	2	2	1	1	1	1	2	**17**/22
Muğla	2	1	1	2	0	1	1	1	1	1	0	**11**/22
Ordu	2	0	2	2	0	2	2	0	2	2	0	**14**/22
Sakarya	2	0	2	2	0	1	1	0	2	1	0	**11**/22
Samsun	2	2	2	2	2	2	2	1	1	2	2	**20**/22
Şanlıurfa	2	2	1	2	0	2	0	0	2	0	0	**11**/22
Tekirdağ	2	2	2	2	2	2	1	2	2	2	2	**21**/22
Trabzon	2	2	2	2	0	2	2	1	2	2	2	**19**/22
Van	2	2	2	2	1	2	2	1	2	2	0	**18**/22
TOTAL	**59**/60	**53**/60	**55**/60	**59**/60	**34**/60	**57**/60	**53**/60	**35**/60	**42**/60	**52**/60	**39**/60	

There are 11 online applications in the list of "*Online Applications Related to Public Relations, Volunteering and Participation Services*" in Table 6. Adana MM, Istanbul MM and Konya MM got the highest score with a "*22 full score*" out of a total of "*22 full scores*". Ankara MM, Bursa MM, İzmir MM, Kahramanmaraş MM and Tekirdağ MM also achieved the second highest score with "*21 points*". While the lowest score is in Muğla MM, Sakarya MM and Şanlıurfa MMs with "*11 points*", the second lowest score is in Mardin MM with "*13 points*". The average score of metropolitan municipalities in this group was calculated as "***17.93 points***". According to Table 6, it was determined that the online application with the highest score was "*59 points*", "*Document Application/Tracking System Applications*" and "*Information, Request and Complaint System Applications*". The lowest scoring online application in this category is "*Service and Satisfaction Evaluation System Applications*" with "*34 points*". It was determined that the online applications in this group have an average score of "***48.91 points***".

Table 7. Online Applications Related to E-Information and E-Access Services

Metropolitan Municipality	Meat - Fish Market Prices Information Services	Vegetable and Fruit Market Prices Information Services	City Lines Transportation Route and Prices Information Services	Social Facilities Activity Information and Price Services	Sacrifice Place and Slaughterhouse Applications	Other Services and Tariffs Information Services	Applications of Access to Information Services of Other Institutions Related to the City (electricity, etc.)	Access Services to E-Government Applications	Access Button/Link to CIMER Application	Live Camera and Other Display Applications	Counseling and Asylum Services Applications	Open Data and Statistics Applications	Lost/Found/Person Applications	Announcements, Announcements and Let Me Know Applications	TOTAL SCORE
Adana	2	2	2	1	1	2	1	2	0	1	1	2	0	2	**19**/28
Ankara	2	2	2	2	2	2	2	0	0	2	2	2	2	2	**24**/28
Antalya	2	2	2	2	1	2	2	0	2	1	1	2	0	2	**21**/28
Aydın	1	0	2	2	2	2	2	0	0	1	1	2	2	2	**19**/28
Balıkesir	2	2	2	2	0	2	2	1	1	2	2	2	0	2	**22**/28
Bursa	2	2	2	2	1	2	2	2	1	2	2	2	1	2	**25**/28
Denizli	0	2	2	1	1	2	1	2	1	2	1	2	2	2	**21**/28
Diyarbakır	0	0	2	1	1	2	1	2	1	2	1	2	1	2	**18**/28
Erzurum	0	0	2	1	2	2	1	2	1	2	1	2	2	2	**20**/28
Eskişehir	0	2	2	1	1	2	1	2	1	1	1	2	1	2	**19**/28
Gaziantep	2	2	2	1	1	2	2	1	0	1	2	1	0	2	**19**/28
Hatay	2	2	2	2	1	2	2	2	0	2	2	2	2	2	**25**/28

İstanbul	2	2	2	2	1	2	2	0	0	2	2	2	2	2	**23**/28
İzmir	2	2	2	2	2	2	2	1	0	2	2	2	2	2	**25**/28
Kahraman-maraşş	0	2	2	2	1	2	2	2	2	2	2	2	2	2	**25**/28
Kayseri	1	1	2	2	1	2	2	2	2	2	2	2	2	2	**25**/28
Kocaeli	2	2	2	2	2	2	2	2	0	2	2	2	2	2	**26**/28
Konya	2	2	2	2	2	2	2	0	0	2	2	2	2	2	**24**/28
Malatya	0	2	2	1	1	2	2	0	0	2	2	2	1	2	**19**/28
Manisa	0	2	2	2	1	2	2	0	0	0	2	2	2	2	**19**/28
Mardin	0	0	1	1	1	1	1	2	2	1	1	2	0	1	**14**/28
Mersin	0	1	2	1	1	2	1	1	1	0	1	2	2	1	**16**/28
Muğla	0	1	2	1	1	1	1	2	1	1	1	2	0	1	**15**/28
Ordu	1	2	2	1	1	2	2	0	0	1	2	2	0	2	**18**/28
Sakarya	0	0	2	1	1	1	2	2	0	0	2	2	1	2	**16**/28
Samsun	0	2	2	2	2	2	2	2	2	0	2	2	2	2	**24**/28
Şanlıurfa	0	0	2	2	0	2	2	0	2	2	2	2	0	2	**18**/28
Tekirdağ	0	2	2	2	2	2	2	0	2	2	2	2	1	2	**23**/28
Trabzon	0	2	2	2	0	2	2	2	0	2	2	2	1	2	**21**/28
Van	0	2	2	1	0	2	2	2	2	0	2	2	2	2	**21**/28
TOTAL	**25**/60	**45**/60	**59**/60	**47**/60	**34**/60	**57**/60	**52**/60	**36**/60	**24**/60	**42**/60	**50**/60	**59**/60	**37**/60	**57**/60	

There are 14 online applications in the "*Online Applications Related to E-Information and E-Access Services*" list in Table 7. Kocaeli MM achieved the highest score with "*26 points*" out of a total of "*28 full scores*", while Bursa MM, Hatay MM, İzmir MM, Kahramanmaraş MM and Kayseri MM achieved the second highest score with "*25 points*". While the lowest score is in Mardin MM with "*14 points"*, the second lowest score is in Muğla MM with "*15 points*". The average score of metropolitan municipalities in this group was calculated as "***20.8 points***". According to Table 7, it was determined that the online application with the highest score was "*59 points*", "*City Lines Transportation Route and Prices Information Services Applications*" and "*Open Data and Statistics System Applications*". It is seen that the lowest scoring online application in this category is "*CIMER* (presidency communications center) *Applications Access Button/Link Applications*" with "*24 points*". It was determined that the online applications in this group have an average score of "***44.57*** points".

Table 8. Online Applications within the Scope of Promotion/Information Services Regarding Activities and Applications

Metropolitan Munucipality	E-President Services and Applications (Notify President)	E-Assembly Services and Applications	E-Committee Services and Applications	Tender Announcement Tracking Systems	Annual Reports Access Services	Audit Reports Access Services	Strategic Plan Access Services	UKOME Decisions Access System	City Guide, Museum, Tourism Location and Promotion Services	Other Location Applications (Istanbul Pharmacy, etc.)	Culture - Art Activities Information and Pricing Services	Service Information and Promotion Services	TOTAL SCORE
Adana	0	1	0	2	2	2	2	1	2	2	2	2	**18**/24
Ankara	2	2	2	2	2	2	2	2	2	2	2	2	**24**/24
Antalya	2	2	2	2	2	2	2	2	2	1	2	2	**23**/24
Aydın	1	1	0	2	2	2	2	1	2	2	2	2	**19**/24
Balıkesir	2	2	2	2	2	2	2	2	2	2	2	2	**24**/24
Bursa	2	2	0	2	2	2	2	2	1	1	2	2	**20**/24
Denizli	1	2	2	1	1	1	1	2	2	2	2	1	**18**/24
Diyarbakır	1	2	0	2	2	2	2	1	2	2	2	2	**20**/24
Erzurum	1	2	0	2	2	2	2	2	2	2	2	2	**21**/24
Eskişehir	2	2	0	2	2	2	2	1	2	2	2	2	**21**/24
Gaziantep	1	2	2	2	2	2	2	1	2	2	2	2	**22**/24
Hatay	1	2	2	2	2	2	2	2	2	2	2	2	**23**/24
İstanbul	1	2	2	2	1	0	0	2	2	2	2	2	**18**/24
İzmir	2	2	2	2	2	2	2	2	2	2	2	2	**24**/24
Kahramanmaraş	2	2	2	2	2	2	2	2	2	2	2	2	**24**/24
Kayseri	1	2	2	2	2	2	2	2	2	2	2	2	**23**/24
Kocaeli	2	2	2	2	2	2	2	2	2	2	2	2	**24**/24
Konya	2	2	2	2	1	1	1	2	2	2	2	2	**21**/24
Malatya	2	2	0	2	2	2	2	2	2	2	2	2	**22**/24
Manisa	2	2	0	2	2	2	2	2	2	2	2	2	**22**/24
Mardin	1	2	0	2	2	2	2	2	2	2	2	2	**21**/24
Mersin	1	2	2	2	2	2	2	2	2	2	2	2	**23**/24
Muğla	1	2	2	1	2	2	2	2	2	2	2	2	**22**/24
Ordu	1	2	2	2	2	2	2	1	2	2	2	2	**22**/24
Sakarya	1	2	2	2	2	2	2	1	2	2	2	2	**22**/24
Samsun	1	2	0	2	2	2	2	2	2	2	2	2	**21**/24
Şanlıurfa	1	2	2	2	2	2	2	2	2	2	2	2	**23**/24
Tekirdağ	2	2	2	2	2	2	2	2	2	2	2	2	**24**/24
Trabzon	1	2	2	2	2	2	2	2	2	2	2	2	**23**/24
Van	1	2	0	2	2	2	2	2	2	2	2	2	**21**/24
TOTAL	**41**/60	**58**/60	**38**/60	**58**/60	**57**/60	**56**/60	**56**/60	**53**/60	**59**/60	**58**/60	**60**/60	**59**/60	

There are 12 online applications in the list of "*Online Applications within the Scope of Promotion/Information Services for Activities and Applications*" in Table 8. Ankara MM, Balıkesir MM, İzmir MM, Kahramanmaraş MM, Kocaeli MM and Tekirdağ MM have the highest score with "*24 points*" out of a total of "*24 full scores*"; Antalya MM, Hatay MM, Kayseri MM, Mersin MM, Şanlıurfa MM and Trabzon MM also achieved the second highest score with "*23 points*". While the lowest score is "*18 points*" in Adana MM, Denizli MM, and Istanbul MMs; The second lowest score is found in Aydın MM with "*19 points*". The average score of metropolitan municipalities in this group was calculated as "***21.77*** points". According to Table 8, it was determined that the online application with the highest score was "*Culture and Art Activities Information and Price Services Applications*" with a full score of "*60 points*". The lowest scoring online application in this category is "*E-Committee Services and Applications*" with "*38 points"*. It was determined that the online applications in this group have an average score of "***54.42 points***".

Table 9. Online Applications Related to E-Learning Services and Training Materials

Metropolitan Munucipality	Free Wi-Fi etc. Internet Applications	Audiobook/Library Services	Sign Language Dictionary	Digital Education (e-Learning) Platforms (Online Course)	Animation Studio	Authorship Workshop	Acting Workshop	E-Sports and E-Gaming Applications	Other Informatics, Technology and R&D Applications	TOTAL SCORE
Adana	2	2	0	2	0	0	2	0	1	**9**/18
Ankara	2	2	0	2	2	2	2	2	2	**16**/18
Antalya	2	2	0	1	0	2	2	2	1	**12**/18
Aydın	2	0	0	1	2	2	2	2	1	**12**/18
Balıkesir	2	2	0	1	0	2	2	2	1	**12**/18
Bursa	2	0	0	1	2	2	2	2	1	**12**/18
Denizli	2	1	0	1	0	0	2	0	1	**7**/18
Diyarbakır	2	2	0	2	2	2	2	1	1	**14**/18
Erzurum	2	0	0	1	0	2	2	0	1	**8**/18
Eskişehir	2	0	0	1	2	2	2	0	1	**10**/18
Gaziantep	2	2	0	2	2	2	2	2	2	**16**/18
Hatay	2	0	0	2	0	2	2	0	1	**9**/18
İstanbul	2	2	2	2	2	2	2	2	2	**18**/18
İzmir	2	2	0	2	2	2	2	2	1	**15**/18
Kahramanmaraş	2	0	0	2	0	2	2	0	1	**9**/18

Kayseri	2	0	0	2	2	2	2	2	1	**13**/18
Kocaeli	2	2	0	2	2	2	2	2	2	**16**/18
Konya	2	0	0	2	2	2	2	2	2	**14**/18
Malatya	2	2	0	2	2	2	2	0	1	**13**/18
Manisa	2	0	0	2	0	0	2	0	1	**7**/18
Mardin	2	0	0	0	0	0	2	0	1	**5**/18
Mersin	2	0	0	2	0	2	2	0	1	**9**/18
Muğla	2	0	0	2	0	2	2	0	1	**9**/18
Ordu	2	0	0	2	0	0	0	0	1	**5**/18
Sakarya	2	0	0	2	2	2	2	0	1	**11**/18
Samsun	2	2	0	2	0	2	2	0	1	**11**/18
Şanlıurfa	2	0	0	0	0	0	2	0	1	**5**/18
Tekirdağ	2	0	0	2	0	2	2	0	1	**9**/18
Trabzon	2	0	0	2	0	0	2	0	1	**7**/18
Van	2	0	0	1	0	0	2	0	1	**6**/18
TOTAL	**60**/60	**23**/60	**2**/60	**52**/60	**26**/60	**44**/60	**58**/60	**23**/60	**35**/60	

There are 9 online applications in the "*Online Applications Related to E-Learning Services and Training Materials*" list in Table 9. Out of a total of "*18 full scores*", Istanbul MM scored the highest with "*18 points*"; Ankara, Gaziantep and Kocaeli MM also achieved the second highest score with "*16 points*". While the lowest score was "*5 points*" in Mardin MM, Ordu MM and Şanlıurfa MMs; The second lowest score is found in Van MM with "*6 points*". The average score of metropolitan municipalities in this group was calculated as "***8.96 points***". According to Table 8, the online application with the highest score was "*60 points*" with the full score "*Free Wi-Fi etc. Internet Applications*". It is seen that the lowest scoring online application in this category is "*Sign Language Dictionary*" with "*2 points*". It was determined that the online applications in this group have an average score of "***35.88 points***".

Table 10. Online Applications Related to Culture and Art Services

Metropolitan Munucipality	Online Story, Poetry, etc. Listening Applications	Online Show, Theatre, Film, Exhibition, etc. Monitoring Applications	Online Talk, Conference, etc. Applications Related to Events	Online Tv/Radio Services	Online Advertising, Design, Digital Media, etc. Services	Online Ticket / Announcement Operations	Orchestra Recording, Activities and Supervision Practices	Online Publishing and Organization Services	TOTAL SCORE
Adana	2	2	2	2	2	1	2	1	**14**/16
Ankara	2	2	2	2	2	2	2	2	**16**/16
Antalya	2	2	2	2	2	2	2	2	**16**/16
Aydın	2	2	2	2	2	1	2	2	**15**/16
Balıkesir	2	2	2	2	2	1	2	2	**15**/16
Bursa	2	2	2	2	2	2	2	2	**16**/16
Denizli	2	2	2	1	2	2	2	2	**15**/16
Diyarbakır	2	2	2	1	2	1	2	1	**13**/16
Erzurum	2	2	2	2	2	1	2	2	**15**/16
Eskişehir	2	2	2	2	2	2	2	2	**16**/16
Gaziantep	2	2	2	2	2	2	2	2	**16**/16
Hatay	2	2	2	2	2	1	2	2	**15**/16
İstanbul	2	2	2	2	2	2	2	2	**16**/16
İzmir	2	2	2	2	2	2	2	2	**16**/16
Kahramanmaraş	2	2	2	2	2	2	2	2	**16**/16
Kayseri	2	2	2	2	2	2	2	2	**16**/16
Kocaeli	2	2	2	2	2	2	2	2	**16**/16
Konya	2	2	2	2	2	2	2	2	**16**/16
Malatya	2	2	2	2	2	1	1	1	**13**/16
Manisa	2	2	2	2	2	1	2	1	**14**/16
Mardin	2	2	2	1	2	1	1	0	**11**/16
Mersin	2	2	2	2	2	1	2	2	**15**/16
Muğla	2	2	2	2	2	1	2	2	**15**/16
Ordu	2	2	2	2	2	1	2	2	**15**/16
Sakarya	2	2	2	2	2	2	2	2	**16**/16
Samsun	2	2	2	2	2	1	2	1	**14**/16
Şanlıurfa	2	2	2	2	2	1	2	2	**15**/16
Tekirdağ	2	2	2	2	2	1	2	2	**15**/16
Trabzon	2	2	2	2	2	1	2	2	**15**/16
Van	2	2	2	2	2	1	2	1	**14**/16
TOTAL	**60**/60	**60**/60	**60**/60	**57**/60	**60**/60	**43**/60	**58**/60	**52**/60	

There are 8 online applications in the "*Online Applications Related to Culture and Art Services*" list in Table 10. Ankara MM, Antalya MM, Bursa MM, Eskişehir MM, Gaziantep MM, Istanbul MM, İzmir MM, Kahramanmaraş MM, Sakarya MM, Kocaeli MM, Konya MM, Kayseri MM out of a total of "*16 full scores*", are the most with "*16 points*". high score; Aydın MM, Balıkesir MM, Denizli MM, Erzurum MM, Hatay MM, Mersin MM, Trabzon MM, Ordu MM, Şanlıurfa MM, Tekirdağ MM, Muğla MM also achieved the second highest score with "*15 points*". The lowest score was Mardin MM with "*11 points*"; The second lowest score is found in Diyarbakır MM and Malatya MM with "*13 points*". The average score of the metropolitan municipalities in this group was calculated as "***15 points***". According to Table 8, the online application with the highest score was "*60 points*" with a full score of "*Online Story, Poetry, etc. Listening Applications*", *"Online Show, Theatre, Film, Exhibition etc. Monitoring Applications*", "Online Interview, Conference, etc. Applications Related to Events" and "*Online Advertising, Design, Digital Media, etc. Services*" has been identified. The lowest scoring online application in this category is "*Online Ticket/ Announcement Transactions*" with "*43 points*". It that the online applications in this group have an average score of "***56.25 points***".

Table 11. Online Applications within the Scope of Human Resources, Economic and Financial Services

Metropolitan Municipality	Municipal Taxes Inquiry and Collection Services	Water/Wastewater, Gas, Geothermal Energy, etc. Collection Transactions of Services	Transportation Services Inquiry and Collection Services	Inquiry and Collection Services for Other Business and Services	Foreclosure Removal Applications	Business Opening and Licensing Procedures Applications	Product Sales Services Applications	Vehicle - Material Rental Services Applications	Agricultural Meteorology Station Data	Allergic Pollen Values Knowledge Base	Citizen/Business Employment Office Applications	Municipality Human Resources Practices	Online Counseling Services for Disadvantaged Groups	Online Promotion/Sales Services for Disadvantaged Groups	TOTAL SCORE
Adana	2	2	2	2	1	2	0	2	0	0	0	2	1	1	**17**/28
Ankara	2	2	2	2	1	1	1	2	0	0	1	1	2	2	**19**/28
Antalya	2	2	2	2	1	1	1	0	1	0	2	1	2	2	**19**/28
Aydın	2	2	1	2	1	2	2	1	0	0	0	1	2	1	**17**/28
Balıkesir	2	2	2	2	1	2	2	1	0	0	0	1	2	1	**18**/28
Bursa	2	2	2	2	1	2	2	2	2	2	2	2	2	1	**26**/28
Denizli	2	2	2	2	1	1	2	2	0	0	1	1	1	0	**17**/28
Diyarbakır	2	2	2	2	1	2	0	1	0	0	1	1	1	0	**15**/28
Erzurum	2	2	2	1	1	2	0	0	0	0	1	1	2	1	**15**/28

Eskişehir	2	2	2	2	1	1	2	1	0	0	1	1	2	0	**17**/28
Gaziantep	2	2	2	2	1	2	2	1	0	0	2	1	1	2	**20**/28
Hatay	2	2	2	2	1	1	1	1	2	2	1	1	1	0	**19**/28
İstanbul	2	2	2	2	2	2	2	2	2	0	2	2	2	2	**26**/28
İzmir	2	2	2	2	1	2	2	1	0	0	1	1	2	1	**19**/28
Kahraman-maraş	2	2	2	1	1	1	0	1	2	0	1	1	2	1	**17**/28
Kayseri	2	2	2	2	1	2	2	0	1	0	2	1	2	0	**19**/28
Kocaeli	2	2	2	2	1	2	2	1	0	0	2	2	1	0	**19**/28
Konya	2	2	2	2	1	2	2	1	2	0	2	1	2	1	**22**/28
Malatya	2	2	2	2	1	2	2	0	0	0	0	1	2	0	**16**/28
Manisa	2	2	2	2	1	1	1	1	2	0	0	1	2	0	**17**/28
Mardin	2	2	1	2	1	2	2	0	0	0	0	0	1	0	**13**/28
Mersin	2	2	2	2	1	2	1	0	2	0	1	1	2	1	**19**/28
Muğla	2	2	1	2	1	1	2	0	0	0	0	1	1	0	**13**/28
Ordu	2	2	2	2	1	2	0	0	0	0	1	1	1	0	**14**/28
Sakarya	2	2	1	2	1	1	1	0	0	0	1	1	1	0	**13**/28
Samsun	2	2	2	2	1	2	2	0	0	0	1	1	2	0	**17**/28
Şanlıurfa	2	2	2	2	1	2	0	0	0	0	0	1	2	0	**14**/28
Tekirdağ	2	2	1	2	1	2	1	2	0	0	1	1	1	0	**16**/28
Trabzon	2	2	2	2	1	2	0	0	0	0	0	1	2	0	**14**/28
Van	2	2	2	2	1	1	0	0	0	0	1	1	1	0	**13**/28
TOTAL	**60**/60	**60**/60	**55**/60	**58**/60	**31**/60	**50**/60	**36**/60	**21**/60	**16**/60	**4**/60	**28**/60	**33**/60	**48**/60	**17**/60	

There are 14 online applications in the list of "*Online Applications within the Scope of Human Resources, Economic and Financial Services"* in Table 11. Istanbul MM and Bursa MM scored the highest with "*26 points*" out of a total of "*28 full scores*"; Konya MM also achieved the second highest score with "*22 points*". While the lowest score was "*13 points*" in Mardin MM, Muğla MM, Sakarya MM and Van MMs; The second lowest score is found in Trabzon MM, Şanlıurfa MM and Ordu MM with "*14 points"*. The average score of metropolitan municipalities in this group was calculated as "***17.33 points***". According to Table 11, the online application with the highest score was determined to be "*Municipal Taxes Inquiry and Collection Services*" and "*Water/Wastewater, Gas, Geothermal Energy, etc. Collection Operations*" with a full "*score of 60*". It is seen that the lowest scoring online application in this category is the "*Allergic Pollen Values Knowledge Base*" with "*4 points*". It was determined that the online applications in this group have an average score of "***36.92 points***".

Table 12. Online Applications within the Scope of Social Aid and Funeral Services

Metropolitan Munucipality	Suspended Invoice Application	Suspended Goods Applications	Public Grocery Applications	Family Support Package Applications	Mother - Baby Support Applications	Education Support Package Applications	Social Assistance and Information Practices	Cemetery Information System	Death Registration Entry System (For District Municipalities)	Funeral and Condolence Announcement System	Condolence Houses/Tent Services Applications	TOTAL SCORE
Adana	2	2	2	2	2	2	2	2	1	0	0	**17**/22
Ankara	2	2	2	2	2	2	2	2	1	2	2	**21**/22
Antalya	2	2	2	2	2	2	2	1	1	2	2	**20**/22
Aydın	2	2	2	2	2	1	2	2	1	0	2	**18**/22
Balıkesir	2	1	0	2	1	1	2	2	1	0	1	**13**/22
Bursa	0	0	0	2	2	2	2	2	2	2	1	**15**/22
Denizli	0	2	0	2	1	2	2	2	1	2	2	**16**/22
Diyarbakır	0	1	0	2	1	2	2	2	1	0	1	**12**/22
Erzurum	0	2	2	2	2	2	2	2	1	2	2	**19**/22
Eskişehir	0	1	2	2	2	2	2	2	1	0	1	**15**/22
Gaziantep	0	0	0	2	1	2	2	2	1	2	2	**14**/22
Hatay	2	0	2	1	2	1	1	2	1	2	1	**15**/22
İstanbul	2	1	2	2	2	2	2	2	1	0	1	**17**/22
İzmir	2	2	2	2	2	2	2	2	1	1	2	**20**/22
Kahramanmaraş	0	2	2	2	2	1	2	1	1	2	2	**17**/22
Kayseri	0	1	2	2	0	1	2	2	2	2	1	**15**/22
Kocaeli	2	2	1	2	2	2	2	2	1	2	1	**19**/22
Konya	0	0	1	2	1	2	2	2	1	2	1	**14**/22
Malatya	0	2	2	2	1	1	1	2	1	2	1	**15**/22
Manisa	0	0	1	1	2	1	2	2	1	2	1	**13**/22
Mardin	0	1	0	2	0	1	1	0	0	0	0	**5**/22
Mersin	2	1	2	2	2	2	2	2	1	0	1	**17**/22
Muğla	0	2	0	2	2	2	2	2	1	0	1	**14**/22
Ordu	1	2	2	2	0	2	1	2	1	0	1	**14**/22
Sakarya	0	1	1	1	0	1	2	1	1	2	1	**11**/22
Samsun	0	2	2	2	1	1	2	2	1	0	1	**14**/22
Şanlıurfa	0	2	2	2	2	2	2	2	1	2	2	**19**/22
Tekirdağ	2	1	1	2	1	1	1	2	1	0	1	**13**/22
Trabzon	0	0	0	2	0	1	1	2	1	2	2	**11**/22
Van	0	0	1	2	2	2	2	0	1	2	1	**13**/22
TOTAL	**23**/60	**37**/60	**38**/60	**57**/60	**42**/60	**48**/60	**54**/60	**53**/60	**31**/60	**35**/60	**38**/60	

There are 11 online applications in the list of "*Online Applications within the Scope of Social Aid and Funeral Services*" in Table 12. Ankara MM has the highest score with "*21 points*" out of a total of "*22 full scores*"; Antalya MM and İzmir MM also achieved the second highest score with "*20 points*". While the lowest score is "*5 points*" in Mardin MM; The second lowest score is found in Sakarya MM and Trabzon MM with "*11 points*". The average score of metropolitan municipalities in this group was calculated as "***15.20 points***". According to Table 12, the online application with the highest score was "*Family Support Package Applications*" with a "*full score of 57*". The lowest scoring online application in this category is "*Pending Invoice Application*" with "*23 points*". It was determined that the online applications in this group have an average score of "***41.45 points***".

Table 13. Online Applications within the Scope of Services for Human Health and Stray Animals

Metropolitan Munucipality	Home Care, Companion and Hygiene Practices	Home Health Services Applications	Patient Transport and Treatment Services Applications	Health Counseling and Guidance Services		Vaccination and Sterilization Appointment Services Applications	Animal Adoption Services Applications	Animal Protection and Care Information Services	Offensive - Diseased and Injured Animal Notification Applications	Animal Tracking Systems	TOTAL SCORE
Adana	2	2	2	1		2	2	2	2	2	**17**/18
Ankara	2	2	2	2		2	2	2	2	2	**18**/18
Antalya	2	2	2	2		2	2	2	2	2	**18**/18
Aydın	2	2	2	2		2	2	2	2	1	**17**/18
Balıkesir	1	1	2	2		2	2	2	2	1	**15**/18
Bursa	2	2	2	2		2	1	2	2	1	**16**/18
Denizli	2	2	2	2		2	2	2	2	2	**18**/18
Diyarbakır	2	2	2	1		2	2	2	2	2	**17**/18
Erzurum	1	1	1	1		2	2	2	2	1	**13**/18
Eskişehir	2	2	2	2		2	2	1	1	2	**16**/18
Gaziantep	2	2	2	2		2	2	2	2	2	**18**/18
Hatay	2	1	2	1		2	2	2	2	1	**15**/18
İstanbul	2	2	2	2		2	2	2	2	2	**18**/18
İzmir	2	2	2	2		2	2	2	2	2	**18**/18
Kahramanmaraş	2	2	2	2		2	2	2	2	2	**18**/18
Kayseri	2	2	2	2		2	1	2	1	1	**15**/18

Kocaeli	2	2	2	2		2	2	2	2	1	**17**/18
Konya	2	2	2	1		2	2	2	2	2	**17**/18
Malatya	2	2	1	1		2	2	2	2	2	**16**/18
Manisa	2	2	1	1		2	2	2	2	1	**15**/18
Mardin	0	0	0	0		2	2	2	1	1	**8**/18
Mersin	2	2	1	1		2	2	2	2	2	**16**/18
Muğla	2	2	2	2		2	2	2	2	2	**18**/18
Ordu	2	2	2	2		2	2	2	2	2	**18**/18
Sakarya	2	2	1	2		2	2	2	2	2	**17**/18
Samsun	2	2	2	2		2	2	2	2	2	**18**/18
Şanlıurfa	2	2	1	2		2	2	2	2	1	**16**/18
Tekirdağ	2	2	2	2		2	2	2	1	1	**16**/18
Trabzon	2	1	0	2		2	2	2	2	2	**15**/18
Van	2	2	2	1		2	2	2	2	2	**17**/18
TOTAL	**56**/60	**54**/60	**50**/60	**49**/60		**60**/60	**58**/60	**59**/60	**56**/60	**49**/60	

There are 9 online applications in the list of "*Online Applications within the Scope of Services for Human Health and Stray Animals*" in Table 13. Ankara MM, Antalya MM, Denizli MM, Gaziantep MM, Istanbul MM, İzmir MM, Kahramanmaraş MM, Muğla MM, Samsun MM and Ordu MM scored the highest with "*18 points*" out of a total of "*18 full scores*"; Adana MM, Aydın MM, Diyarbakır MM, Kocaeli MM, Konya MM, Sakarya MM and Van MM also achieved the second highest score with "*17 points*". While the lowest score was "*8 points*" in Mardin MM; The second lowest score is found in Erzurum MM with "*13 points*". The average score of metropolitan municipalities in this group was calculated as "***16.36 points***". According to Table 12, it was determined that the online application with the highest score was "*Vaccination and Sterilization Appointment Services Applications*" with a full score of "*60 points*". The lowest scoring online application in this category is "*Health Counseling and Guidance Services*" and "*Animal Tracking Systems*" with "*49 points*". It was determined that the online applications in this group have an average score of "***54.55 points***".

Table 14. Total and Average Scores of Metropolitan Municipalities Online Applications

Metropolitan Municipality	Table 3	Table 4	Table 5	Table 6	Table 7	Table 8	Table 9	Table 10	Table 11	Table 12	Table 13	TOTAL SCORE	SCORE PERCENTAGE (%)
Adana	12/26	16/24	6/18	22/22	19/28	18/24	9/18	14/16	17/28	17/22	17/18	167/244	68,44
Ankara	24/26	23/24	17/18	21/22	24/28	24/24	16/18	16/16	19/28	21/22	18/18	223/244	91,39
Antalya	18/26	14/24	8/18	19/22	21/28	23/24	12/18	16/16	19/28	20/22	18/18	188/244	77,05
Aydın	20/26	11/24	7/18	19/22	19/28	19/24	12/18	15/16	17/28	18/22	17/18	174/244	71,31
Balıkesir	18/26	13/24	14/18	19/22	22/28	24/24	12/18	15/16	18/28	13/22	15/18	183/244	75,00
Bursa	21/26	20/24	14/18	21/22	25/28	20/24	12/18	16/16	26/28	15/22	16/18	206/244	84,43
Denizli	17/26	20/24	9/18	18/22	21/28	18/24	7/18	15/16	17/28	16/22	18/18	176/244	72,13
Diyarbakır	21/26	15/24	7/18	14/22	18/28	20/24	14/18	13/16	15/28	12/22	17/18	166/244	68,03
Erzurum	18/26	14/24	8/18	17/22	20/28	21/24	8/18	15/16	15/28	19/22	13/18	168/244	68,85
Eskişehir	20/26	15/24	8/18	16/22	19/28	21/24	10/18	16/16	17/28	15/22	16/18	173/244	70,90
Gaziantep	18/26	14/24	9/18	16/22	19/28	22/24	16/18	16/16	20/28	14/22	18/18	182/244	74,59
Hatay	10/26	11/24	11/18	16/22	25/28	23/24	9/18	15/16	19/28	15/22	15/18	169/244	69,26
İstanbul	24/26	21/24	18/18	22/22	23/28	18/24	18/18	16/16	26/28	17/22	18/18	221/244	90,57
İzmir	23/26	22/24	15/18	21/22	25/28	24/24	15/18	16/16	19/28	20/22	18/18	218/244	89,34
Kahramanmaraş	19/26	14/24	10/18	21/22	25/28	24/24	9/18	16/16	17/28	17/22	18/18	190/244	77,87
Kayseri	22/26	17/24	11/18	20/22	25/28	23/24	13/18	16/16	19/28	15/22	15/18	196/244	80,33
Kocaeli	20/26	21/24	13/18	19/22	26/28	24/24	16/18	16/16	19/28	19/22	17/18	210/244	86,07
Konya	22/26	18/24	15/18	22/22	24/28	21/24	14/18	16/16	22/28	14/22	17/18	205/244	84,02
Malatya	13/26	15/24	6/18	20/22	19/28	22/24	13/18	13/16	16/28	15/22	16/18	168/244	68,85
Manisa	20/26	16/24	11/18	20/22	19/28	22/24	7/18	14/16	17/28	13/22	15/18	174/244	71,31
Mardin	11/26	8/24	3/18	13/22	14/28	21/24	5/18	11/16	13/28	5/22	8/18	112/244	45,90
Mersin	11/26	14/24	5/18	17/22	16/28	23/24	9/18	15/16	19/28	17/22	16/18	162/244	66,39
Muğla	10/26	10/24	8/18	11/22	15/28	22/24	9/18	15/16	13/28	14/22	18/18	145/244	59,43
Ordu	14/26	12/24	6/18	14/22	18/28	22/24	5/18	15/16	14/28	14/22	18/18	152/244	62,30
Sakarya	9/26	8/24	6/18	11/22	16/28	22/24	11/18	16/16	13/28	11/22	17/18	140/244	57,38
Samsun	14/26	16/24	13/18	20/22	24/28	21/24	11/18	14/16	17/28	14/22	18/18	182/244	74,59
Şanlıurfa	20/26	14/24	8/18	11/22	18/28	23/24	5/18	15/16	14/28	19/22	16/18	163/244	66,80
Tekirdağ	22/26	13/24	11/18	21/22	23/28	24/24	9/18	15/16	16/28	13/22	16/18	183/244	75,00
Trabzon	15/26	14/24	8/18	19/22	21/28	23/24	7/18	15/16	14/28	11/22	15/18	162/244	66,39
Van	15/26	13/24	9/18	18/22	21/28	21/24	6/18	14/16	13/28	13/22	17/18	160/244	65,57
Genel Ortalama	17,37	15,07	9,87	17,93	20,80	21,77	8,96	15,00	17,33	15,20	16,36	176/244	71,99
Genel Başarı Oranı (%)	66,81	62,79	54,83	81,50	74,29	90,71	49,78	93,75	61,89	69,09	90,89	72,13	

The online applications implemented by the Metropolitan Municipalities were evaluated separately under 11 groups, and then collectively evaluated in Table 14. There are 122 online applications in total in 11 different tables. Ankara MM achieved the highest score with a "*total score of 223*" out of a total of "*244 full scores*". Thus, a success rate of *91.39%* was achieved according to the total score (244 points). The other most successful municipalities and their success rates in metropolitan cities are respectively; Istanbul MM (221 points - 90.57%), İzmir MM (218 points - 89.34%), Kocaeli MM (210 points - 86.07%), Bursa MM (206 points - 84.43%) and Konya MM (205 points - 84.02%).

According to Table 14, the lowest score was in Mardin MM with "*112 points*", and the success rate was measured as *45.90%*. Other low scores, respectively; Sakarya MM (140 points - 57.38%), Muğla MM (145 points - 59.43%), Ordu (152 points - 62.30%) and Van MM (160 points - 65.57%). The average score in total of the metropolitan municipalities in all groups was calculated as "***176 points***". The success rate of this average score compared to the total score was determined as **71.99%.**

The general scores of 11 online service groups created within the scope of the research are presented collectively in Table 14. According to the data obtained, the online service groups with the highest scores were respectively "*Table 10. Online Applications Related to Culture and Art Services" (93.75%); "Table 13. Online Applications within the Scope of Services for Human Health and Stray Animals" (90,89%)* and *"Table 8. Online Applications within the Scope of Promotion/Information Services for Activities and Practices" (90.71%)*. According to Table 14, the online service groups with the lowest scores were "*Table 9. Online Applications Related to E-Learning Services and Educational Materials" (49.78%); "Table 5. Online Applications Related to City Life and Environmental Services" (54.83%)* and *"Table 11. Online Applications within the Scope of Human Resources, Economic and Financial Services" (61.89%)*.

4. Conclusion

Determination of the number and implementation rates of online (e-municipality) applications, which is the fundamental sub-component of smart governance, of 30 metropolitan municipalities as the most effective local government units in Turkey, by grouping and comparing with other municipalities is discussed. First, it is aimed to identify and group the local online applications in Turkey, to determine how many of them are implemented in the metropolitan municipalities and to compare them with each other by creating score tables among metropolitan municipalities. Thus,

it was possible to compare the success scores of metropolitan municipalities by determining which online services they provide and which ones they are insufficient. With the comparisons made, the supply and demand ratios of online services and applications were also revealed. The scope of the research is 30 metropolitan municipalities in Turkey. In the research, the corporate web pages of the metropolitan municipalities were analyzed by the scanning (content analysis) method.

Within the scope of the research, *122 smart* governance based online services of metropolitan municipalities were determined and they were classified in *11* different subgroups. Each online service was rated with a score of "2 points" (*full: 2 points – partially: 1 point – none: 0 points*). At the final evaluation of the data, the most successful municipalities out of a total of "*244 full scores*"; **Ankara MM (223 points - 91.39%)**, Istanbul MM (221 points - 90.57%), İzmir MM (218 points - 89.34%), Kocaeli MM (210 points - 86.07%), Bursa MM (206 points - 84.43%) and Konya MM (205 points - 84.02%). According to the results of the analysis, the metropolitan municipalities with the lowest scores are respectively; **Mardin MM (112 points - 45.90%)**, Sakarya MM (140 points - 57.38%), Muğla MM (145 points - 59.43%), Ordu (152 points - 62.30%) and Van MM (160 points - 65.57%). The average score in total of the metropolitan municipalities in all groups was calculated as "***176 points***". The success rate of this average score compared to the total score was determined as **71.99%.**

According to the findings, İstanbul MM (5 units), Ankara MM (3 units), İzmir MM (3 units), Kahramanmaraş MM (3 units), Antalya MM (2 units), Gaziantep MM (2 units), Kocaeli MM (2 units), Konya MM (2 units), Adana MM (1 unit), Balıkesir MM (1 unit), Bursa MM (1 unit), Denizli MM (1 unit), Eskişehir MM (1 unit), Kayseri MM (1 unit)), Muğla MM (1 unit), Ordu MM (1 unit), Sakarya MM (1 unit), Samsun MM (1 unit) and Tekirdağ MM (1 unit) achieved full points/score in some groups. However, Aydın MM, Diyarbakır MM, Erzurum MM, Hatay MM, Malatya MM, Manisa MM, Mardin MM, Mersin MM, Şanlıurfa MM, Trabzon MM and Van MM did not achieve full points in any of the online service groups. The online service groups that metropolitan municipalities got the most full points (6 items) were determined as "*Online Applications Within the Scope of Promotion/Information Services Regarding Activities and Applications" (12),"Online Applications Regarding Human Health and Stray Animal Services" (10)* and *"Online Applications Related to Public Relations, Volunteering and Participation Services"*. However, no municipality has achieved full points/ scores in the online service groups of "*Online Applications Regarding City Life and Environmental Services", "Online Applications within the Scope of Human*

Resources, Economic and Financial Services" and *"Online Applications within the Scope of Social Aid and Funeral Services"*.

Within the scope of the research, 9 of the 122 applications included in the 11 online service groups were obtained full scores by all metropolitan municipalities. To illustrate it clearly, these online service applications have been implemented by all 30 metropolitan municipalities in Turkey. These mentioned online service applications are respectively; "*E-President Services and Applications (Notify President)" (Table 8), "Free Wi-Fi et al. Internet Applications"* (Table 9), *"Online Story, Poetry, etc. Listening Practices"* (Table 10), *"Online Show, Theatre, Film, Exhibition, etc. Monitoring Practices"* (Table 10), *"Online Interview, Conference, etc. Applications Related to Events"* (Table 10), *"Online Advertising, Design, Digital Media, etc. Services"* (Table 10), *"Municipal Taxes Inquiry and Collection Services"* (Table 11*), "Water/ Wastewater, Gas, Geothermal Energ, etc. Collection of Services"* (Table 11) and *"Vaccination and Sterilization Appointment Services Applications"* (Table 13).

The main constraints of the research are listed as the type/number of municipalities where data was collected, the public services evaluated and the date of the evaluation. First of all, not all municipalities in Turkey were evaluated in this context. Only provincial municipalities and only the provincial municipalities that are metropolitan cities were included in the scope of the research. Therefore, a separate study can be conducted on the other 51 provincial municipalities. Again, such a study can be carried out on district municipalities and town municipalities in non-metropolitan provinces. In addition, the metropolitan municipalities within the scope of the study were evaluated independently from the district municipalities within the provincial borders. In this context, the main reason why the study is limited to 30 metropolitan municipalities is that they have wider financial and human resources compared to other types of municipalities and offer online services at higher standards.

According to various legislative provisions in Turkey, local governments are authorized to provide "local" and "common" public services, provided that they are not prohibited. This situation has caused a wide variety in the types and numbers of services. For this reason, not all local public services were taken into account in our study. Services offered online and those based on "governance" of these services have been identified and grouped. Therefore, separate studies can be carried out on other services that do not fall into this group.

The last limitation of the study is the date range in which the data collection process was carried out. The data subject to the research were

obtained by examining the corporate web pages of all metropolitan municipalities between 15.03.2022 and 15.04.2022. Therefore, online service applications that were not active on the web page on these dates or that were added/updated later were not included in the scope of the study. For this reason, this comprehensive study, in which both an individual metropolitan municipality analysis and also all of them are compared, should be done again in certain periods. Thus, it will make the developments and success rates more measurable in this context.

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