

CHANGES IN THE MANAGEMENT OF ELECTRONIC PUBLIC SERVICES IN THE METROPOLIS DURING THE COVID-19 PANDEMIC

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Abstract: The Covid-19 pandemic has radically affected social and organizational behavior. The aim of the article is to indicate the number and scope of public services provided electronically during the Covid-19 pandemic. Research in this area has not been conducted so far. The authors give answer to the research question on how the limitations of social mobility during the pandemic contributed to the use of public services provided electronically. The research was carried out using the methods of a classic telephone interview and a questionnaire directed to a deliberately selected research sample. As a result of the study it was found that these limitations generated a radical increase in the number of e-services delivered by local government administration and the need to verify the methods of information management and communication with the society used so far.

The trend may turn out to be much more persistent than the sanitary restrictions that triggered it. Local government units that were the subject to the study recorded an increase in the number of public services provided with use of the Electronic Platform of Public Administration Services (ePUAP) by 170.8% in 2020 compared to the number before the pandemic in 2019.

Key words: Covid-19 pandemic; e-administration; ePUAP; electronic communication, public administration.

DOI: 10.17512/pjms.2021.24.2.16

Article history:

Received October 04, 2021; *Revised* October 28, 2021; *Accepted* November 10, 2021

Introduction

Electronic access to public services in Poland was launched in 2008. The nationwide ICT platform ePUAP, i.e. the Electronic Platform of Public Administration Services, is the basic form of remote communication of citizens with public administration and of mutual communication of public entities in Poland.

It should be noted that, according to the definition adopted by the European Commission, "e-government is the use of information and communication technologies (ICT) in public administration, in connection with organizational changes and the acquisition of new skills in order to improve the quality of public services provided, to strengthen citizen's involvement in democratic processes and to support the state policy. In such approach e-government is a concept broader than the mere availability of services provided electronically by the administration"

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(Grodzka 2009). It is therefore an attempt to create a public administration system that is not only efficient and effective, but also citizen-friendly. Obviously, this aspect should be considered in conjunction with the level of digital education of the society and the desire to limit the range of the spheres of exclusion, which in this respect result from poverty, lack of knowledge or the possibility of its completion.

The need to introduce a program of computerization of public administration referred to the regulations of the European Union and resulted from the public discourse on improving the provision of public services. In Poland the development of the document "Action plan for the development of electronic administration (e-Government) for the years 2005-2006" is considered the beginning of the development of e-government. The document contained the legal framework of the country's computerization process, presented an assessment of activities carried out in the field of e-government, described the projects implemented by the Polish administration (Ziemia et al. 2013). The introduction of e-administration is not limited only to replacing the traditional contact with the office by an on-line contact, but is intended to improve the operation of administration and the quality of services provided. E-administration also forces the modernization of offices and management methods in order to provide services for all citizens, including people with disabilities; moreover, e-administration increases the transparency of officials' activities, supports citizens' mobility, reduces the operating costs of offices and brings many other benefits both for the officials themselves and their customers.

Services available to individual citizens are related with as follows: health; registration, information about the change of the place of stay; birth, marriage and death certificates; public library catalogues and their searching; building permits; vehicle registration, identity documents; social benefits. The following services are available to entrepreneurs: public procurement; permits and certificates; property tax; business registration (Kuzior and Sobotka 2021; Kowalczyk 2020; Romaniuk 2020; Sitek et al. 2020; Skoczyńska-Prokopowicz 2017; Ingaldi and Ulewicz 2018). Businesses also had to adapt to a world changed by the pandemic (Baryshnikova et al., 2021; Klimecka-Tatar and Ulewicz, 2021). The interest of Polish citizens in e-services has not been very high so far, even if the range of available services is quite wide. In other European countries, citizens' interest in e-services is greater. This statement is confirmed by research conducted in Great Britain, where citizens use e-government because it gives them a sense of their own effectiveness and satisfaction (Alruwaie et al. 2020). Interesting research on the relationship between demographic factors (age, gender, place of residence) and the use of e-services was carried out by Sundberg (2020). However, what influences citizens' interest in e-services has not been fully researched yet.

The authors of the paper decided to investigate how the Covid-19 pandemic influenced citizens' interest in public administration e-services. The conducted study allowed answering the following research questions: Have the limitations of social mobility during the Covid-19 pandemic contributed to the increased use of public services provided electronically? (Q1); Do larger urban agglomerations record a

greater increase in e-services, while in smaller communes an increase in public administration e-services is lower? (Q2); Is the increase in the number of cases handled by ePUAP directly proportional to the income generated by communes per number of residents, i.e. the higher the income per capita, the more cases are handled by ePUAP? (Q3). Research in this area has not been conducted so far.

Issues related to the use of ICT in public administration are discussed in numerous scientific articles. Smart technologies have changed the way governments and local governments communicate with citizens and have successively increased the range of services available on various mobile and desktop devices (smartphones, laptops and desktop computers), although the available functionalities do not yet meet the required standards and often fail at the stage of implementation and use (Al-Sakran and Alsudairi 2021; Pappel et al. 2021; Karpagavalli 2021; Baheer et al. 2020; Budai and Tóza 2020; Krawczyk 2020; Tsybulnyk et al. 2020; Anthopoulos et al. 2016). Research and scientific papers also concern e-administration in terms of accessibility for people with disabilities, (Król and Zdonek 2020), as well as seniors (Llorente-Barroso et al. 2018), the use of social media by public administration to communicate with citizens with the possibility of obtaining feedback (Cho and Melissa 2021), analysis of Digital Government architecture with proposals for reference architecture (Baheer et al. 2020), digital competences of citizens and officials, legal regulations for electronic access to various digital functionalities and problems with the availability of e-services (Kowalska-Chrzanowska et al. 2021, Synowiec 2021; Falloon 2020; McQuiston and Manoharan 2020; Burlaka et al. 2019), shaping the image of countries and regions (Mikhnevych 2020, Bilan et al. 2019; Ibragimov et al. 2019), as well as the need to modify and change e-administration tools generated by various factors (Mourad and Latifa 2020).

Despite two decades of development of e-administration, the social acceptability of digital solutions as well as the legislative and political framework are not yet at a satisfactory stage of development (Wierzbowski et al. 2021; Pardal 2020). Therefore, government administration and local government administration should take advantage of the experience developed in the business (Kwilinski 2018), where modern solutions based on artificial intelligence and cognitive technologies revolutionize and optimize the activities of enterprises and can also be used in designing and implementation of sustainable social development (Kwilinski et al. 2019; Kuzior 2010). Ideas based on the use of artificial intelligence and cognitive technologies to some extent, although very slowly, are breaking through to be used in e-administration (Chae 2020). However, broader digital education of citizens will be needed so that such solutions can be effectively implemented and accepted by internal and external users of e-administration. Comparative research is also carried out (Shkarlet et al., 2020; El Ammar and Profiroiu, 2020).

The situation related to the use of functionality of public administration e-services changed during Covid-19. However, the number of articles on issues related to e-services provided during the Covid-19 pandemic is relatively small and concerns legal regulations (Hoffman and Balázs 2021) rather than social and business activity

in the use of e-services. This paper fills the research gap in this area by presenting empirical re-search on this phenomenon.

Pandemic as a generator of increase in the use of e-services. Results of empirical study

In order to verify the impact of the pandemic in 2020 on the provision of public services via the electronic platform a study was conducted on the number of cases referred to offices via ePUAP.

When starting the study the researchers identified three research problems and asked three research questions:

The research question (Q1) relates to whether the limitation of social mobility contributed to a radical increase in interest in contacting the public administration with use of electronic tools.

The research question (Q2) relates to whether larger urban areas record a greater increase in e-services, while in smaller communes the increase in e-services is lower in the analyzed period.

The research question (Q3) relates to whether the increase in the number of cases handled through ePUAP is directly proportional to the income achieved by communes per number of residents, i.e. the higher the income per capita, the more cases are handled by ePUAP.

The Upper Silesian and Zagłębie Metropolis called Metropolis GZM (in Polish: Górnośląsko-Zagłębiowska Metropolia), i.e. the first legally formalized metropolitan area in Poland, was selected as the research field. Metropolis GZM may constitute a separate research field as it is determined by administrative boundaries. The metropolis consists of 41 communes and spreads on the area of 2.55 thousand km², inhabited by 2.38 million residents. The metropolis is located in a highly urbanized part of the Silesian Voivodeship, and within metropolis there are 240 000 companies operating that generate approx. 8% of Polish GDP.

Methods and Data Collection

At the turn of April and May 2021 data on the scale of use of the ePUAP platform in 2019 and 2020 data were collected from 41 local government units in the Metropolis GZM. The first data concerned the facts for 2019, which was another year of introducing the progressing computerization in the provision of public services. On the other hand, the second parameter were data for 2020, when restrictions related to the SARS-CoV-2 coronavirus pandemic were introduced at the beginning of March, which with different levels of severity lasted until the end of the year. The list was to reveal the assumed scale of increase in the use of the ePUAP electronic platform (see Table 1).

During the study citizens with a national identification number PESEL (in Polish: Powszechny Elektroniczny System Ewidencji Ludności – Universal Electronic System for Registration of the Population that is in force in Poland) could use ePUAP provided that they authenticated themselves in the computer network via a free trusted profile or commercial qualified electronic signature. Trusted profile as a form

of Internet identification was confirmed by users e.g. via selected electronic banking systems or after a personal visit to the confirmation point. In addition to ePUAP, in the area constituting the research field, there was a regional public administration platform that has been created since 2005 for the public administration of the Silesian Voivodeship under the name SEKAP (System of Electronic Communication of Public Administration), which, however, was falling out of use and due to the planned exclusion in 2021 was not a subject to analysis.

Table 1. Number of activities related to the provision of public services in the Metropolis GZM

	Com- mu- ne	Number of cases on ePUAP in 2019	Number of cases on ePUAP in 2020	Increa- se in %	Number of residents at the end of 2019	Commune budget per capita	<i>Commune budget at the end of 2019</i>	<i>Gro- up type</i>
1	U	2528	4680	185	56354	4 724 PLN	266 216 296 PLN	G1
2	U	1838	2592	141	19507	6 331 PLN	123 498 817 PLN	G3
3	R	1189	1624	136	12132	5 006 PLN	60 732 792 PLN	G2
4	R	1212	1551	129	7924	5 316 PLN	42 123 984 PLN	G2
5	DR	6334	17072	269	165263	5 679 PLN	938 528 577 PLN	G2
6	R	955	1095	115	6358	5 073 PLN	32 254 134 PLN	G2
7	DR	5847	12496	214	107807	6 529 PLN	703 871 903 PLN	G3
8	U	1655	2576	156	31405	5 455 PLN	171 314 275 PLN	G2
9	DR	4930	12311	250	119373	7 114 PLN	849 219 522 PLN	G3
10	R	1247	2213	177	12183	6 103 PLN	74 352 849 PLN	G3
11	DR	12738	26443	207	178603	7 281 PLN	1 300 408 443 PLN	G3
12	U	1319	1495	113	9189	5 807 PLN	53 360 523 PLN	G2
13	DR	39270	65675	167	292774	7 437 PLN	2177360 238 PLN	G3
14	U	1789	3151	176	38112	5 159 PLN	196 619 808 PLN	G2

15	R	1047	1219	116	4905	5 501 PLN	26 982 405 PLN	G2
16	U	1855	2272	122	16798	4 878 PLN	81 940 644 PLN	G1
17	U	3470	4028	116	22202	5 359 PLN	118 980 518 PLN	G2
18	R	874	1136	130	7635	5 055 PLN	38 594 925 PLN	G2
19	U	2520	5163	205	41014	6 139 PLN	251 784 946 PLN	G3
20	DR	3584	9145	255	74618	5 761 PLN	429 874 298 PLN	G2
21	R	1010	1200	119	5795	6 657 PLN	38 577 315 PLN	G3
22	DR	2573	5411	210	55030	5 845 PLN	321 650 350 PLN	G2
23	R	1216	1754	144	12013	4 871 PLN	58 515 323 PLN	G1
24	R	1188	1694	142	12221	5 429 PLN	66 347 809 PLN	G2
25	U	2009	3140	156.2	18429	5 868 PLN	108 141 372 PLN	G2
26	U	1064	1660	156	16873	5 352 PLN	90 304 296 PLN	G2
27	DR	5467	15278	279	137360	6 073 PLN	834 187 280 PLN	G3
28	R	1128	1461	129	10643	5 098 PLN	54 258 014 PLN	G2
29	DR	3330	7796	234	66841	5 645 PLN	377 317 445 PLN	G2
30	U-R	1160	1705	147	12417	5 718 PLN	71 000 406 PLN	G2
31	U	967	1000	103	6983	5 473 PLN	38 217 959 PLN	G2
32	DR	10050	24780	246	199974	5 290 PLN	1057862 460 PLN	G2
33	U-R	1136	1475	130	8909	5 696 PLN	50 745 664 PLN	G2
34	R	998	1739	174	12401	5 130 PLN	63 617 130 PLN	G2
35	DR	2250	4048	180	49557	5 153 PLN	255 367 221 PLN	G2
36	U	4450	8349	188	61686	5 042 PLN	311 020 812 PLN	G2
37	DR	6378	13390	210	127590	7 124 PLN	908 951 160 PLN	G3
38	U	990	1398	141	8942	4 060 PLN	36 304 520 PLN	G1

39	R	1161	1605	138	8409	5 563 PLN	46 779 267 PLN	G2
40	DR	3889	11027	283	172360	5 749 PLN	990 897 640 PLN	G2
41	R	4978	5689	114	16261	5 497 PLN	89 386 717 PLN	G2

Source: own study.

Total average increase (in %) in the communes of the metropolis with the division into urban communes (U), rural communes (R), urban-rural communes (U-R) and cities with district rights (DR). R=143,6, U=150,6, U-R=138,3, DR=231.2.

The information presented in the article was obtained as a result of contact with representatives of local government units in the Metropolis GZM through a classic telephone interview and a questionnaire inquiry addressed to a deliberately selected research sample group. Basic data was obtained on the number of letters addressed to a specific office via ePUAP in the entire year 2019 and - for comparative purposes – on the number of letters addressed to this office in the entire year 2020.

Results

As a result of the study it was found that in the communes of the Metropolis GZM the number of cases handled through ePUAP increased in 2020 by an average of 170.8% compared to their number recorded in 2019. Such a significant increase in use of electronic platform is the answer to the research question (Q1) about direct impact of pandemic on changing the habits of local government administration customers regarding the remote form of using the public services. The pandemic limitations of social mobility clearly contributed to the increased use of the ePUAP platform. This shows that the competency, psychological and technological barriers to contact the society with administration and administration with society remotely are being overcome.

During Covid-19, there was a transformation of social mobility practices (Kłeczek et al. 2020), i.e. the movement of people for various purposes, including in order to deal with administrative matters in the offices of communes. Due to the forced lockdown, social mobility was significantly limited, which in turn forced the handling of administrative matters electronically and expanding digital competences of public administration officials and changes in management methods. The trend may turn out to be much more persistent than the sanitary restrictions that triggered it. Previous research related to Covid-19 and e-government services mainly concerned e-services related to the health care sector (Brodowicz 2021; Zadka and Olajossy 2021; Robakowski and Synowec 2020) and education (Butola 2021; Romaniuk and Łukasiewicz-Wielba 2021; Sieradzka-Baziur 2020) and did not take up the issues of the impact of limiting social mobility on the increased interest in e-government services. Thus, the research carried out and the answer to the question posed fill the research gap in this area. Another research problem was to identify the factors determining the scale of this increase. The citizens apply to

offices remotely, wanting to handle issues from strictly defined catalogues of public services. Therefore, a question can be asked whether the specificity of a given commune affects the number of cases reported through ePUAP.

In order to get an answer the obtained data on the use of ePUAP platform were compared with the number of residents of the cities studied. Comparative analysis showed a significantly higher increase in large cities. Applying the criterion of division of communes considering the number of residents of above 50 thousand people, 13 cities with district status were selected (having from 56 thousand to 292 thousand people). In this area the number of cases reported to local government administration via ePUAP increased in the analyzed period on average by approx. 231.2%. On the other hand, in the remaining area, this percentage was on average of about 144.2%. When verifying the facts in small towns (of up to 10 000 inhabitants) it turned out that the increase was definitely the lowest as it did not exceed 123%. The data obtained in the study are the answer to the research question (Q2).

Having established that there is a relation between the size of the town and its population with the increase in use of the ePUAP platform by the users, a research question was asked about the importance of the next parameter, i.e. the prosperity of the commune. Therefore, the number of cases carried out via the electronic platform by the public administration units under study was compared with the income per capita achieved by local governments.

For the purpose of the study three groups of communes were formed. In the first one (G1), the per capita income recorded at the end of 2019 amounted no more than 4999 PLN. The second group (G2) consisted of communes with an income from 5000 PLN to 6000 PLN, and the next group consisted of communes (G3) with an income of above 6001 PLN. It was found that communes with the lowest income also recorded the lowest increase in the number of cases handled via ePUAP. This increase was 148.2%. Along with the increase in the wealth of the local community, the use of remote tools for contact with administration increased. And so in the next group the increase was 164.5%, and in the group of communes with the highest income: 196.9%. Thus, the answer to the research question (Q3) was obtained.

Thanks to the analyzes that were carried out it can be concluded that during the pandemic the technique of remote provision of public services was most often used by customers from wealthier, larger and more densely populated communes.

Conclusion

Based on the collected statistical data it can be concluded that already in 2018, in the process of providing electronic services in Poland, 96.5% of public administration units used the electronic inbox available on the ePUAP platform (GUS 2019, 23). In reality, however, virtual access of citizens to some public services was impossible. It is illustrated by the conclusions regarding the use of the popular program "Family 500+", which entered into force on April 1, 2016. Applying to the project, referred to on the website of the Republic of Poland as the "main instrument of family policy", was not possible everywhere with the use of Internet tools. In 2018 only 65.5% of

public administration units allowed electronic submission of applications for the "Family 500+" program. The research studies of the Central Statistical Office (GUS) showed that submission of applications by electronic means was most often allowed by commune offices (77.1%), much less often – by district offices (11.8%), and in marshal's offices there was no such possibility at all (GUS, 2019, 71). Moreover, the data published in March 2021 by the Central Statistical Office among Polish Internet users show that in 2020, when dealing with the administration, the customers limited themselves to downloading the official forms (25.4%), obtaining information from the websites of offices and public institutions (27.2%) and returning completed forms (33.5%). Based on interviews with representatives of individual offices, it was found that the functioning of e-administration solutions also raised many other controversies. Some were caused by interpretation problems or the formulation of additional requirements for citizens. An example is "unlawful practice of tax authorities, which demand that a copy of the power of attorney made in paper form – instead of via ePUAP – must be sent by post to be added to the files of the proceedings" (Knawa 2021). According to officials providing source data for this article, the number of implemented e-services depends on the access to the Internet and funds available for computer equipment among residents. Larger cities offer more places to confirm trusted profiles or qualified signatures necessary for the implementation of e-services, which cannot be provided by smaller cities or rural areas. Moreover, especially large cities with district rights additionally have opportunities to actively promote e-services or conduct awareness-raising campaigns among residents. According to the officials' observations people with higher education, from larger cities, in a good financial situation and those with children use e-services more often. Lack of digital competences among the residents, especially among elderly people, farmers, unskilled manual workers, usually living in rural areas or small towns, is a significant problem. The psychological aspect which is a strong belief in the value of paper documents is a barrier to the dissemination of e-services.

The implementation of modern IT solutions in the practice of public administration also raises problems with adapting to the new standards of equipment, applicable procedures and staff training level. The issue of so-called e-delivery was given as an example in the studied period, because "it has been stated that the act on electronic delivery is to enter into force as early as October 2020, and in accordance with its current form, the local government would be obliged to e-delivery from January 1, 2024. Unfortunately, the current level of preparation of local governments for the implementation of e-delivery is insufficient and requires the implementation of IT systems for electronic management of documentation as well as organizational-and-functional changes" (Kotyła 2020).

Despite the indicated weaknesses of computerization in the provision of public services, it should be assumed that this process will continue. The use of remote forms of dealing with official matters by the customers is a desirable direction of development. It not only ensures efficiency, high quality and transparency of service,

but is also user-friendly. Paradoxically, the Covid-19 pandemic also translated into an increase in the use of e-administration tools by the citizens. It shows that the competency, psychological and technological barriers to contact administration remotely are being overcome. Although this change was triggered by a pandemic, the trend could turn out to be much more persistent than the sanitary restrictions that caused it. Therefore, it is a field of further research with an outlined research question – will the tendencies of increased use of e-administration functionalities be permanent and citizens' interest in use of e-services will not decrease with the withdrawal of sanitary restrictions. Signaling the scope of further research, a pilot review of the characteristics of public services provided through ePUAP was carried out on the example of the City of Zabrze. In the pilot study the authors covered the period from January 1, 2021 to May 26, 2021. As a result of the pilot study it was found that the citizens who were natural persons mainly dealt with the following matters via the electronic platform in the following order: (1) information about the sale or purchase of vehicle - 1157 cases, (2) issues related to the issuance of an ID card - 980 cases, (3) issuing a civil status document - 818 cases, (4) registration for permanent or temporary residence and notification of de-registration - 556 cases, (5) notification of the birth of a child - 426 cases. The scale of implementation of remote techniques in the provision of e services is evidenced by the fact that only in the first quarter of 2021 in Zabrze a similar scale of use of the ePUAP platform by residents was recorded as throughout the whole 2019. Taking into account the results of the first quarter of 2021, it can be assumed that 2021 will also be closed with an increase in the use of e-administration functionalities based on modern information and communication technologies (ICT). This may be the first harbinger of the lasting nature of the pandemic-initiated changes in the use of e-administration services and of breaking down barriers related to technological changes.

The directions of further research should also take into account blockchain issues. This technology is very promising for modern solutions in the public sector and can positively affect many administrative processes, but it can also be destructive. A systematic review of the literature on this problem has shown great interest of researchers in the use of blockchain technology in the public sector. Scientific studies provide a lot of important information on the potential of blockchain in providing public services (Cagigas et al. 2021). However, out of 103 publications cited in the quoted study, there is no one referring to the specificity of Polish conditions. Therefore, it is an important topic to be undertaken in subsequent studies on the implementation of modern technologies in e-administration.

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ZMIANY W ZARZĄDZANIU ELEKTRONICZNYMI USŁUGAMI PUBLICZNYMI W METROPOLII PODCZAS PANDEMII COVID-19

Streszczenie: Pandemia Covid-19 radykalnie wpłynęła na zachowania społeczne i organizacyjne. Celem artykułu jest wskazanie liczby i zakresu usług publicznych świadczonych drogą elektroniczną podczas pandemii Covid-19. Badania w tym zakresie nie były dotychczas prowadzone. Autorzy odpowiadają na pytanie badawcze, w jaki sposób ograniczenia mobilności społecznej podczas pandemii przyczyniły się do korzystania z usług publicznych świadczonych drogą elektroniczną. Badanie przeprowadzono metodą klasycznego wywiadu telefonicznego oraz kwestionariusza skierowanego do celowo dobranej próby badawczej. W wyniku badania stwierdzono, że ograniczenia te spowodowały radykalny wzrost liczby e-usług świadczonych przez administrację samorządową oraz konieczność weryfikacji dotychczas stosowanych metod zarządzania informacją i komunikacji ze społeczeństwem. Trend może okazać się znacznie trwalszy niż ograniczenia sanitarne, które go wywołały. Badane jednostki samorządu terytorialnego odnotowały w 2020 roku wzrost liczby usług publicznych świadczonych z wykorzystaniem Elektronicznej Platformy Usług Administracji Publicznej (ePUAP) o 170,8% w stosunku do liczby sprzed pandemii w 2019 roku.

Słowa kluczowe: pandemia Covid-19; e-administracja; ePUAP; komunikacja elektroniczna, administracja publiczna.

COVID-19 大流行期间大都会电子公共服务管理的变化

摘要： Covid-19 大流行从根本上影响了社会和组织行为。本文旨在说明在 Covid-19 大流行期间以电子方式提供的公共服务的数量和范围。迄今为止，尚未进行该领域的研究。作者回答了关于大流行期间社会流动性的限制如何促进使用电子提供的公共服务的研究问题。该研究是使用经典电话采访和针对特意选择的研究样本的问卷调查的方法进行的。研究结果发现，这些限制导致地方政府管理部门提供的电子服务数量急剧增加，并且需要验证迄今为止使用的信息管理和与社会沟通的方法。这种趋势可能比引发它的卫生限制更加持久。与2019年大流行之前的数量相比，作为研究对象的地方政府单位在2020年使用公共行政服务电子平台（ePUAP）提供的公共服务数量增加了170.8%。

关键词： Covid-19 大流行；电子行政；ePUAP；电子通信；公共管理