

OPTIMIZING THE PROVISION OF PUBLIC SERVICES BY LOCAL ADMINISTRATION AS A COMPONENT OF THE SMART CITY CONCEPT ON THE EXAMPLE OF ZABRZE

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Abstract:

Surveys performed among the residents of Zabrze indicate that in 2021 the majority of respondents (67%), wishing to use public services provided by the local government, still preferred to visit the office in person. Residents noticed negative aspects of direct service, such as queues of people waiting for the case to be completed (26%), excessive bureaucracy (24%) or lack of parking spaces (18%). However, they counted on help in completing the necessary formalities by officials who should be: professional (20%), communicative (18%) and kind (17%). The use of the digital platform (ePUAP) dedicated to customer service was reported by 32% of respondents. At the same time, as much as 40% of the respondents, in order to save time and to simplify procedures, declared their will to use innovative methods of remote contact with public administration (e.g. via social media). The COVID-19 pandemic showed that it was possible to increase (even by 250%) the number of cases handled remotely, which with over 90% of households in Poland with access to a computer network creates opportunities for integrated development as part of the Smart City idea. The aim of the paper was to identify the residents' expectations related to the provision of public services by local administration. Precise determination of the ways of perception of both direct and remote customer service has not only an application value. It also allows for further research study on the management of local government, including the organization of management control, as well as social communication of local governments.

Key words: *Smart City, city management, local government, public services, remote communication*

INTRODUCTION

The concept of Smart City is based on the assumption of using own resources more effectively, i.e. in a creative and intelligent way [1]. On a global scale this also applies to the development of smart city administration [2]. Focusing on the conditions of the functioning of the Polish municipal administration system, the attitude of local authorities responsible for performing public tasks in communes is an important aspect for the implementation of this approach. Pursuant to the *act on municipal self-government*, these authorities, acting on their own behalf and on their own responsibility (Article 2 Item 1) [3], deal with all public affairs of local importance, not reserved by statutes for other entities (Article 6 Item 1) [3] in order to satisfy collective needs of the self-government community. Basing on the applicable regulations, they have the freedom to shape the strategy and tactics of proceedings aimed at achieving the assumed goals, and the independence of

communes is subject to judicial protection (Article 2 Item 3) [3]. The administrative map of Poland subdivides 2477 communes, including 302 urban communes, 652 urban-rural communes and 1523 rural communes as well as 66 cities with district rights [4]. The quality of individual activities related to the performance of public tasks, as well as taking into account the assumptions of intelligent and sustainable development in this field, largely depends on the intentions and competences of people managing the communes. It can even be said that the figures provided reflect the scale of potential plans, initiatives and methods for implementation of Smart City programmes. This does not mean, of course, that virtually all communes apply comprehensive solutions. Rather, they are single improvements that do not significantly affect the standard of living of the residents, the natural environment and the reduction of public spending. It causes that both in theoretical and practical terms local government management

should be focused on systemic solutions in the field of communication, energy, social services, waste management and water and sewage management [5, 6]. The degree of implementation of the smart city idea in the functioning of public administration is, however, particularly clear in the field of e-government. Maintaining relations with the local government by the residents through state-of-the-art computer technologies means that also in this area the concepts of a *digital city* or a *connected city* become real, where virtual space and connections play a key role in the digital city, and digital cities group communities that use a wide range of IT and innovative services in their everyday live [7]. A smart city is a unit with a technologically distinguished infrastructure potential, which is characterized by a certain ability to independently analyse events and situations and flexibly respond to changes in the surrounding environment, which by definition is to contribute to improving the quality of life of residents [8, 9]. Local authorities, representing the community of inhabitants, seem to be particularly interested in implementing the mechanisms of sustainable and intelligent development. They prepare officials for high-level service delivery in a smart city [10].

LITERATURE REVIEW - PROVISION OF PUBLIC SERVICES WITH USE OF A DIGITAL PLATFORM

The provision of public services is an important area under the control of local government, and at the same time significantly affecting the level of approval of residents towards administrative structures. The continuous improvement of the quality in this respect is one of the components of creating smart cities friendly to residents. This applies, among others, to improving customer service during contacts both via the computer network and during direct service. An important sphere of implementation of innovative solutions is the constant increase in the number of official activities required by law, which can be fully or mostly completed remotely, because technological advancement makes the physical presence of a citizen in the office unnecessary to settle the matter [11, 12]. At the national level it is possible thanks to the Electronic Platform of Public Administration Services (ePUAP).

The system, in a uniform and standardized manner, allows clients to maintain relations with the public administration after authentication via a free trusted profile or commercial qualified electronic signature. The use of e-administration services provided free of charge via this platform requires prior registration in the system and obtaining a user account, but then allows electronic access to services offered, for example, by state administration, local government, tax administration or the National Health Fund and the Social Insurance Institution [13]. The use of the ICT network for the provision of public services initiated the development of the *EGovernment Action Plan 2005-2006*. The document contained the legal framework for the process of computerization of Poland, presented an assessment of activities carried out in the field of e-government, described projects implemented by the Polish administration [14].

Public services of local government administration are directly related to own tasks and tasks assigned to the commune, which should be located in such areas as social policy, i.e. education, health care, social assistance, culture, recreation, sport, housing, employment market or public safety. In the technical sphere, this applies to, among others, public transport, ecology, telecommunication, as well as energy, municipal, water and waste management [15]. On the other hand, administrative activities relate to e.g. obtaining and registering data, issuing documents, granting concessions and permits, etc.

The report of the Supreme Audit Office of 2021 on the practice of using ePUAP emphasizes the constant increase in the number of available e-services (from 72 as of January 1, 2016 to 148 as of June 30, 2020), which is accompanied by an increase in the number of citizens with a trusted profile (from 524.3 thousand as of January 1, 2016 to 7226.8 thousand as of June 30, 2020), which was reflected in the systematic increase in the number of cases completed: 2016 – 265.3 thousand, 2017 – 3830.4 thousand, 2018 – 69356.6 thousand, 2019 – 137392.3 thousand [16] (Fig. 1). In this context, it is worth noting that 90.4% of households in Poland have access to the Internet [4]. This illustrates the potential possibility of increasing the scope of e-government activities.

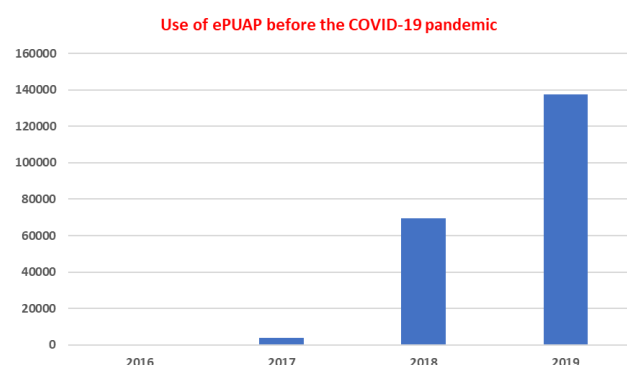


Fig. 1 Number of cases (in thousands) related to public services handled in Poland by the ePUAP system before the COVID-19 pandemic

Source: Based on data from the Supreme Audit Office.

The technical possibility of using cyberspace resources for the provision of public services, however, is only part of the process of disseminating such solutions. The level of e-competences among citizens as a condition necessary for the further development of computerization processes in public administration and the availability of services provided is another aspect [17]. The habits of clients and officials also play an important role. The increased interest in the use of a computer network was triggered by the COVID-19 pandemic that has prevailed since March 2020. This is illustrated by the results of a survey conducted in 2021 by employees of the Silesian University of Technology in 41 municipalities making up the Metropolis GZM, i.e. the first statutorily formalized metropolitan area in Poland (Table 1, 2).

Table 1
Total average increase in the number of cases handled by ePUAP (in %) in 2020 compared to 2019 in cities with district rights of the Metropolis GZM

	Cities with district rights	Increase in %
1.	Będzin	185.1
2.	Bytom	269.5
3.	Chorzów	213.7
4.	Dąbrowa Górnicza	249.7
5.	Gliwice	207.5
6.	Katowice	167.2
7.	Mysłowice	255.1
8.	Piekary Śląskie	210.2
9.	Ruda Śląska	279.4
10.	Siemianowice Śląskie	234.1
11.	Sosnowiec	246.5
12.	Świętochłowice	179.9
13.	Tychy	209.9
14.	Zabrze	283.5
	Total average increase in %	227.9

Table 2
Total average increase in the number of cases handled by ePUAP (in %) in 2020 compared to 2019 in GZM communes with division into urban (U), rural (R) and urban-rural (U-R) communes

	Commune	Increase in %	
1.	Bieruń	141	U
2.	Bobrowniki	136.5	R
3.	Bojszowy	127.9	R
4.	Chełm Śląski	114.6	R
5.	Czeladź	155.6	U
6.	Gierałtów	177.4	R
7.	Imielin	113.3	U
8.	Knurów	176.1	U
9.	Kobiór	116.4	R
10.	Lędziny	122.4	U
11.	Łaziska Górne	116	U
12.	Mierzęcice	129.9	R
13.	Mikołów	204.8	U
14.	Ożarów	118.8	R
15.	Pilchowice	144.2	R
16.	Psary	142.5	R
17.	Pyskowice	156.2	U
18.	Radzionków	156	U
19.	Rudziniec	129.5	R
20.	Siewierz	146.9	U-R
21.	Sławków	103.4	U
22.	Sośnicowice	129.8	U-R
23.	Świerklaniec	174.2	R
24.	Tarnowskie Góry	187.6	U
25.	Wojkowice	141.2	U
26.	Wyry	138.2	R
27.	Zbrosławice	114.2	R
	Total average increase in %	141.2	R = 143.6 U = 145.8 U-R = 138.3

The subject of the analysis was the number of public services provided using the ePUAP digital platform in 2020 compared to the level before the pandemic in 2019. It has turned out that the average increase was of approx. 170%. At the same time, larger urban clusters recorded a

higher scale of increase, as it was of 228%, while in smaller communes an increase of only 141% was recorded. The increase in the number of e-services was also directly proportional to the income generated by communes per number of residents. In the group of communes with the lowest income, it oscillated around 150%, and in the richest, it reached 200% [18].

Despite the shortcomings indicated by the Supreme Audit Office in the report following the examination of the functioning of the ePUAP system – especially with regard to the security of collected and processed data [16] – further computerization of the provision of public services is an announcement of further improvements in the functioning of local administration, which may serve not only improving the quality of customer service. The use of electronic tools in making and maintaining contacts with stakeholders allows for a radical increase of the scope of these relationships, among others for consultations, public opinion polls, obtaining comments and suggestions, reporting problems important for local communities, etc. The inclusion of the communication aspect in activities using cyberspace resources may also contribute to the activation and integration of residents, creating a civil society or increasing social participation in exercising power. In addition to the availability of instruments that allow to create a modern approach to the functioning of the commune within the Smart City concept and the level of e-competences among officials and residents much depends on the motivation, consistency and determination of people managing public administration. The idea of Smart City requires that decision-makers not only secure the provision of all services from above, but create an effective and encouraging space for activity, entrusting a significant part of their tasks to private partners and non-governmental organizations [19]. What matters is the effectiveness of translating theoretical assumptions into the practice of managing a city that aspires not only to be friendly, but also intelligent [20]. There are relatively many publications on Smart City. They describe smart cities from different perspectives [21, 22, 23, 24, 25, 26, 27, 28, 29]. In 2022, the Scopus database indexed 1,568 articles on this topic.

RESEARCH METHODS

Desk research methods and an analysis of the literature on the subject were used in the preparation of the article. The empirical part concerning the determination of the acceptance level of remote and direct service by the inhabitants of Zabrze was developed on the basis of quantitative research. For this purpose, a questionnaire study was conducted with the participation of 600 people, with a random selection of the research sample. Another questionnaire survey with 675 people was carried among the customers of the City Hall, because in 2021 a programme of cyclical questionnaire interviews with customers was implemented. Additionally, the analysis of Google Maps for the Street View function was performed. User feedback may be helpful in making management decisions due

to the ease of determining the social perception of the organization and facilitating the identification of threats. This applies to disclosing, and even making public, the areas of risk related to the implementation of specific processes by the organization as well as its overall image. Therefore, the analysis of entries in Google Maps is also in some way useful as a control study against the results obtained during the research dedicated to the stakeholders of the Zabrze City Hall.

RESEARCH STUDY ON THE RESIDENTS' PERCEPTION OF THE PROVISION OF PUBLIC SERVICES IN A REMOTE AND DIRECT FORM

Opinions of respondents regarding preferences in terms of contacts with local government administration

In order to establish the level of approval of clients for remote and direct service at the City Hall in Zabrze, a questionnaire survey was carried out in December 2021 with the participation of 600 people. The age structure of the respondents, randomly selected in the city, was as follows: under 18 – approx. 3%, from 18 to 35 – approx. 23%, from 36 to 65 – approx. 56%, and above 65 – approx. 18%. People declaring living in Zabrze, commenting on their preferences regarding the form of contact with local government administration, most often stated that they prefer to deal with official matters during a personal visit to the city hall. Such an answer was given by approx. 67% of respondents. On the other hand, the rest of the survey participants (approx. 32%) stated that the Electronic Platform of Public Administration is more effective, easier and time-saving method.

Despite the significantly higher level of interest in direct service at the city hall in relation to the use of remote techniques, the respondents also pointed to the disadvantages related to the need to come to the headquarter of public administration in order to deal with an official matter in person. Analysing individual criteria negatively affecting the perception of arriving to the city hall, in order to carry out the activities required by the regulations, the respondents pointed to factors generating the highest level of dissatisfaction, such as: queues of people waiting in offices (26%), excessive bureaucracy (24%), lack of places to park a car (18%), the need to adjust the time of the visit to the office hours (14%), difficulties in determining where the relevant department is (9%), discomfort resulting from contact with the clerk (4%) and problems with arriving to the office (1%) (Fig. 2). In responses to the open-ended question about the factors influencing the reduction in the level of approval in connection with a personal visit to the city hall, the respondents also occasionally indicated: ignorance of how to quickly obtain information about the scope of tasks of individual departments, reluctance to help by officials, incompetence of some employees, as well as the lack of a single stand where all official procedures can be carried out.

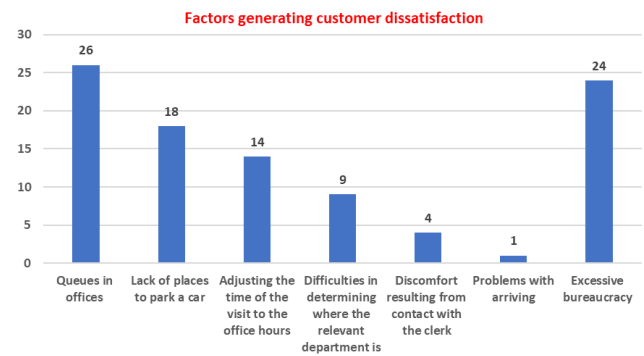


Fig. 2 Reasons for the negative perception of direct visits to the office by the customers

During the survey the residents were asked about their interest in using innovative technological solutions that would enable the improvement of the provision of at least some public services by local government administration. It was found that a significant group of respondents expected the possibility of remote provision of public services, but – what is particularly important – through easily accessible, simple and time-saving methods. Over 40% of the respondents would like to use a private e-mail address for this purpose or use their social media accounts (e.g. Facebook profile). 27% of respondents expressed their dislike of similar technological innovations, and the rest (32%) did not have an opinion on this matter (Fig. 3).

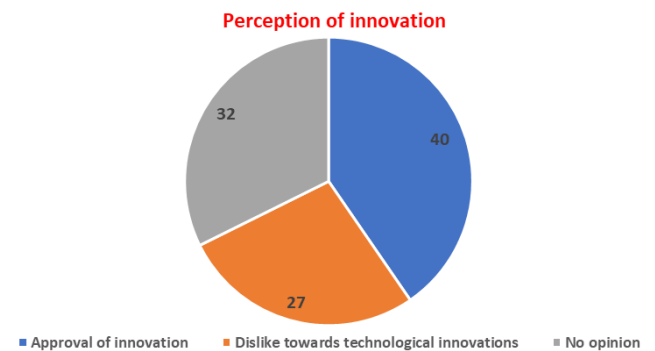


Fig. 3 Opinions of respondents on the implementation of innovative digital solutions in the provision of public services by the administration (in %)

Analysis of the opinions collected among the clients contacting the city hall in person

The views expressed by respondents who are residents of Zabrze, who could but did not have to have personal experience in dealing with official matters, should be compared with the detailed assessments made during the survey of clients who came personally to the City Hall in Zabrze to settle a specific case. In 2021 a programme of cyclical questionnaire interviews with customers was implemented. The voluntary and anonymity survey covered residents who visited: the customer service point (at 5-7 Powstańców Śląskich St.), the customer service room (at 286 Wolności St.) and the headquarter of the Registry Office (at 211 Wolności St.). The aim was to collect opinions on the quality of the services provided. Data was collected

during three series of interviews conducted: (1) from June 16, 2021 to June 30, (2) from July 26, 2021 to August 6, and (3) from September 27, 2021 to September 30, in the three locations indicated. The result of the research programme was the acquisition of 675 questionnaires. Most respondents were aged between 20-39 (36%) and between 40-59 (34%). The respondents aged over 60 constituted 27% of the respondents. The youngest, up to 20 years old, were only 3% of the respondents.

The interested parties were asked about the perception of service quality. 95% of them rated it as "very good", less than 2% chose a clearly negative note and the others were "rather satisfied". In the case of the above question, the credibility of the obtained data is, however, undermined by the methodology of the research itself conducted by the employees of the city hall. They noticed that people who appeared to be dissatisfied usually refused to talk at all or refused to agree to take the time to respond. Due to the lack of data on the specific number of objections to the number of invitations to participate in the study, the level of dissatisfaction cannot be properly diagnosed. The respondents, while analysing individual parameters influencing their level of satisfaction with service during the visit covered by the study, concluded that "the information provided by the employee was understandable and comprehensive" (99% of responses), and the time of settling the case: "satisfactory" (97%). In view of these two responses identifying the approval level, a methodological reservation regarding the selection of the research sample should also be applied. On the other hand, subsequent answers already have a significant cognitive value. As the reason for coming to the city hall, the respondents most often mentioned the issues related to the competences of: the Department of Civil Affairs (approx. 33%), e.g. obtaining an ID card, the Department of Motor Vehicles (approx. 31%), e.g. issuing a vehicle registration certificate, the Property Management (approx. 7%) e.g. accommodation in a council flat, the Department of Construction (approx. 5%) e.g. issuing a decision on land development conditions, the Department of Real Estate (approx. 5%) e.g. when buying a council flat, the Department of Local Taxes and Fees (approx. 5%) e.g. in connection with tax collection, as well as the Department of Geodesy (approx. 3%) e.g. in the case of real estate division.

When describing the trends of transforming the quality of service since the previous visit to the city hall, the customers most often did not notice the difference in the functioning of the city hall, as 34% of the respondents did not notice any change in the quality of work. However, according to 31% of respondents they have transformed for the better, and only in the opinion of 1% of the respondents, the consequence of changes is the deterioration of the situation in this respect. In turn, 29% had no established view on this subject, and the others declared that they had no point of reference for comparisons, as they were in the city hall for the first time during the study.

According to the respondents, when asked about the issues of work organization and officials' predispositions determining the perception of efficiency and comfort of

service, the most important factors influencing the quality of handling cases are:

- the employee's professionalism having impact on the speed of service (20%)
- the employee's ability to provide information (18%),
- empathy and kindness of the employee (17%),
- the employee's commitment and willingness to help (16%),
- possibility to obtain complete information (10%).
- In further positions the clients ranked, among others: a friendly environment (7%) and clear marking of the city hall (7%).

When asked whether before the visit to the city hall the participants of the study read the information materials dedicated to settling a specific case, the vast majority, i.e. as much as 69% of the respondents replied in the negative. Among the rest (31% of all respondents) for 6% the information or support materials available on the website of the city hall or the Public Information Bulletin are: "inaccessible and illegible, which makes it difficult or discouraging to look not only for information, but also for the necessary forms or applications". However, 82% expressed approval of the quality of these materials, and 12% expressed moderate satisfaction.

The weaknesses of the relations with the city hall indicated by the respondents are mainly the accusations concerning the lack of transparency of the official website, and above all of the Public Information Bulletin, which resulted in difficulties in finding information, applications and forms. Negative comments about the course of the visit concerned difficulties in locating toilets for customers and the lack of air conditioning. Dissatisfaction with the quality of service was also generated by: "employee incompetence", "referrals from one official to another", "impoliteness", "insufficient information", "long waiting in the queue" as well as mentioned several times "excessive bureaucracy", the source of which, however, are national regulations.

Moreover, the participants of the study were offered suggested solutions that could improve the customer service process. The respondents most often expressed the need to rebuild the website and the Public Information Bulletin due to the lack of transparency and availability of information, as well as: extending office hours, increasing the number of service desks, installing air-conditioning devices and developing more understandable forms. Incidentally, requests were also made to "ensure the availability of toilets", "improve the functioning of cash desks in the customer service room", "provide photocopying services", "organize an additional space in front of the service room making it possible to fill out forms and applications", "provide a water dispenser at least in the summer months" or "making sure that a larger number of cases can be dealt with electronically", etc.

The application value of the project was the collection of information for the development of specific activities for the improvement of methods of contact with customers and the improvement of the quality of the provision of public services by local administration. It was confirmed

that for the overwhelming number of respondents the individual approach of the employee and his personal commitment are of particular importance. The inhabitants expected the employee not only to be able to provide comprehensive, reliable and specific information, but also to be polite and empathetic.

Therefore, the survey reinforced the view that a competent and professional employee dealing with individual customer service, presenting a high level of personal culture, influences the perception of the entire local government administration. Interestingly, despite the dissemination and better availability of e-services, the respondents still appreciate the direct contact with officials, as they provide understandable and comprehensive information allowing for the correct and efficient handling of the formalities required by the law. During the implementation of the research project, the public administration did not offer Internet users the help of a virtual assistant who would allow for an individualized approach to the user. The method of remote contact was the use of means of communication or e-mail, which significantly increased the time needed to perform remote operations. Especially in the case of people with lower digital competences.

The perception of the quality of customer service in terms of the opinions of internet users voluntarily posted on external media

In the study conducted among the customers assessing the level of service after the settlement of an official case in the city hall, attention was paid to the possibility of underestimating critical opinions regarding the course of the analysed visit. Therefore, the opinions on the City Hall in Zabrze, posted on external media independent of it, were analysed. One of the popular online tools for precisely determining the location of the object sought by the Internet user is Google Maps, available since 2005. In addition to determining the address, method of reaching or the useful Street View sightseeing function, it is possible to add opinions and ratings regarding the indicated institutions. As a rule, entering comments is voluntary and free, although there are specialized companies dealing with paid creation of the assumed image by adding positive comments, in accordance with the statement that every profile or internet presentation left without control may become a place for negative comments or entries [30].

The tool is intended for people who have personally visited a given place and want to share their feelings resulting from the course of this visit. The analysis that was carried out on March 24, 2022 in the google.pl search engine at the location of the object: "Zabrze City Hall, ul. Powstańców Śląskich 5-7, Zabrze" confirmed the availability of a total of 74 entries made from 2017 to the day preceding the survey. On a five-point scale, 28% of Internet users issued a "very good" notes, "rather good" – 16%, "average" – 13%, "rather bad" – 7% and "very bad" – 35%. Thus, among the notes given, clearly positive ones (44%

as the sum of "very good" and "rather good" notes) prevailed before those clearly negative (42% as the sum of "rather bad" and "very bad" notes), which was generally "average" note.

Apart from issuing a note, Internet users could also post comments in the form. Some were non-substantive as, for example, expressions of antipathy towards political parties or greetings to subsequent users. The vast majority of them, however, referred to the verification of the quality of customer service and reflected the ratings indicating the level of approval or disapproval in a numerical scale. Internet users described specific situations, e.g. "nice and helpful ladies in the customer service windows. Very well-coordinated work, even in severe pandemic conditions. Settlement of matters goes very quickly" or "all officials are nice, helpful, polite! Everything in one place, many workplaces open", but also: "if I stand in the queue from 4:20 p.m., I hope that I will be served. At 5 p.m. the ladies said that they had finished their work. Then let people in until you are sure that people will not stand there for nothing" or "I was standing in a line for half an hour to hear from the lady in window that she finished work and will not serve me". As in the case of the survey, there were opinions concerning, among others, the enormous importance of "efficient and friendly" service, expectations of "professional handling of the matter" and "flexibility and openness" to the problems of customers. The online tool allowed users to include any opinions in the comments, which meant that apart from criticism but also thanks to specific officials, there were also, for example, difficulties with parking the car in the event of a personal visit to the city hall, improper sanitary condition of the toilets for clients or too long waiting times in line.

CONCLUSION

In smart city the final decisions are taken by local authorities, but the decision-making processes are characterized by a multitude of actors, multi-sectoral and multi-level nature, which allows us to talk about the use of the method of coordinating collective actions called co-governance [31]. An important challenge for activities in the area of smart city governance is, in the context of the functioning of local government, creating an optimal environment for the development of knowledge and innovation [8, 32, 33]. The implementation of Smart City solutions in the provision of public services by local administration undoubtedly requires educational activity. It is important to deepen digital competences both on the side of officials and clients.

The habits concerning the form of contacts with the local government, shaped over the years, cause that still many people - having such an opportunity - decide to visit the city hall in person. 67% of residents covered by the study preferred dealing with official matters directly. At that time they expected efficient and quick service. They valued the highest: professional (20%), communicative (18%)

and kind (17%) officials (Fig. 4). On the other hand, when giving the reasons for the negative perception of direct service, they primarily indicated queues of customers waiting in offices (26%), excessive bureaucracy (24%), and the lack of parking spaces in the immediate vicinity of the city hall (18%). Before arriving at the city hall, the majority of the respondents (69%) did not read the details of the documents relating to a given case, available on the computer network, which suggests that they counted on a low level of complexity of formalities or the support of employees.

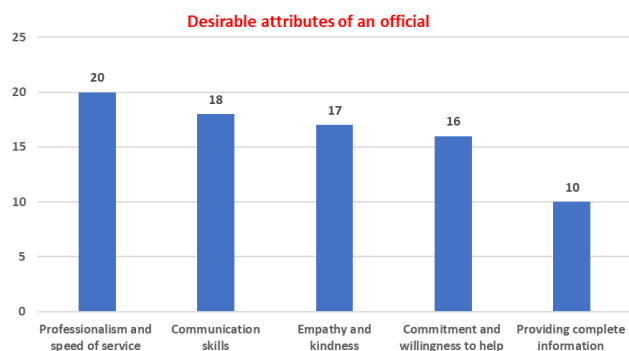


Fig. 4 Opinions of respondents on the desired features and behaviours of officials (in %)

An extraordinary situation, however, may cause a radical change in the habits related to direct service in the city hall, which is documented by an increase of up to 250% the number of cases handled remotely, revealed during the study on the use of the ePUAP platform during a pandemic. Interesting – not only in theoretical terms – is also the residents' desire to use tools facilitating access to public services. Declared by 40% of respondents the readiness to implement innovative techniques using the potential of cyberspace in the field of contacts with local administration may be a challenge for institutions that create national norms and standards for these relations. The main factor generating the approval of the inhabitants towards new technological and organizational solutions seems to be the desire to improve the process of providing public services. Generally, digitization should be perceived as an opportunity to automate and simplify procedures, saving time and money, and also as a supporting tool in making management decisions [34]. Hence, Smart Cities 4.0 aim to ensure the compatibility of functions influencing the quality of life of residents and stakeholders of cities, while ensuring the possibility of economic and social development. By combining such concepts as economy, mobility, environment, people, life and management in the "smart city" trend, a field is created for the implementation of further innovations. The integrated use of Internet technologies plays an important role in this process [35]. This is the next stage of development after Smart Cities 1.0 inspired by ICT tools (intelligent information-and-communication techniques), Smart Cities 2.0, where the public administration managing the infrastructure plays a decisive role, and Smart Cities 3.0 based on the creative involvement of residents [36].

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