BARRIERS TO THE EFFECTIVENESS OF TELEWORKING IN PUBLIC ADMINISTRATION

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Purpose: Teleworking under Covid-19 conditions is, for many organizations, a fundamental requirement to ensure continuity of operation. However, it is not a common way of organizing work in public administration entities. In particular, very few studies have examined the effectiveness of teleworking in local administration. The purpose of this paper is to investigate barriers to the effectiveness of teleworking in local administration in Poland.

Design/methodology/approach: Literature analysis in the paper was prepared using VOSviewer software. Empirical research allowing us to achieve our objective was conducted using the CAWI method among 136 communes and cities with poviat rights from the Mazowieckie Voivodeship.

Findings: We have established that the main obstacle in remote work was technological barriers and lack of appropriate technology in the surveyed entities. As a result of our research, we identified challenges related to insufficient digitalization of services in local administration as the main barrier for teleworking.

Research limitations/implications: The paper uses quantitative research, carried out using the CAWI method, on local government entities in the Mazowieckie Voivodeship, on a research sample of 136 entities.

Practical implications: The results of this research provide important guidance for practitioners and managers of public administration. The results indicate the most significant barriers to implementing remote working in public administration. The benefits of remote working for both citizens and public administration employees are also presented.

Social implications: An analysis of the main challenges of remote working enables adaptation to the ongoing changes. Considering the difficulties of remote administration can help improve the functioning of the administration and, as a result, help to achieve widespread benefits for citizens.

Originality/value: The research presented here explores the introduction of remote working to an unprecedented extent in the wake of the COVID19 virus pandemic.

Keywords: teleworking, local administration, effectiveness, effectiveness barriers.

Category of the paper: Research paper.

1. Introduction

Teleworking is a modern and flexible form of work organisation that is growing in scope every year. The first mentions of remote work in public administration appeared in 1997. At that time, the European Commission created the European Telework Development (Choi, 2018). Teleworking is an entirely unique form of employment, which is characterised by high flexibility. To be able to fully leverage its potential, efficient communication and effective management are required. It differs from the traditional form of work in three essential factors: the place of work, the time of work, and the manner of communication. Teleworking breaks with the paradigm that work is tied to a specific location. Teleworking can be done in any place. The condition, however, is the availability of a suitable ICT infrastructure, which is also used as a communication channel. Teleworking enables employees of public sector organisations to work outside the office using appropriate ICT infrastructure. Still, it can also offer a range of opportunities that are not possible under conventional organisational settings. These include the benefits of reduced office costs as less space is required and work can be spread over areas with lower real estate costs (Mahler, 2012). Time and fuel savings from less commuting are also common (Mahler, 2012). Other savings may come from lower parking costs and less air pollution (Mahler, 2012). Teleworking also offers the opportunity to explore alternative organisational processes. It allows managers to experiment with changing workplace design and work technology (Offstein, Morwick, & Koskinen, 2010).

The Covid-19 pandemic has contributed to the increased use of teleworking in organisations. Under current law: "During the duration of the state of epidemic emergency or state of epidemic declared due to Covid-19, and for a period of 3 months after their cancellation, in order to counteract Covid-19, the employer may order the employee to perform, for a specified period of time, work specified in the employment contract, outside the place of its permanent performance (telework) OJ. 2020, item 374.

The new global reality has caused many employers to reach out to this way of organising work, keeping in mind the health and lives of employees. In the first stage of research on teleworking, the most important issue was related to environmental protection resulting from reduced commuting (Andrey, Burns, & Doherty, 2004; Pérez, Sánchez, De Luis Carnicer, & Jiménez, 2004). Over time, analysis of the effectiveness of task completion (Allen, Golden, & Shockley, 2015), new competencies needed for teleworking, employee motivation, and work-life balance have been added to the telework thread of this.

Despite continued interest from both scholars and practitioners in the issue of teleworking, there is limited research in this area in public administration (Kim, Mullins, & Yoon, 2021). Moreover, the literature often emphasizes that teleworking is a more common practice in state entities than in local government entities (Bae, & Kim, 2016; Caillier, 2016; Kwon, & Jeon, 2017; Mahler, 2012). This is probably because the unique character of local government entities

is based on constant and current contact with a broad group of stakeholders. To make it possible also in teleworking conditions, firstly, appropriate infrastructure is needed, and secondly, a large part of services requires digitalisation. Another important issue is the security of data transmission. In Poland, the process of digitalisation of public services started in 2010 and in the last years it has significantly accelerated. The situation of Coivd-19 pandemic highlighted the importance of implementing up-to-date technologies in local government entities. Without access to these technologies, the continuity of local government operations may be threatened. Therefore, the purpose of this paper is to examine the barriers to the effectiveness of teleworking in public administration. The article is organised as follows. The first part presents a bibliometric analysis, the dimensions of telework in public administration conducted with the use VOSviewer software. The second part concerns research methodology. The third part presents our research on the barriers to the effectivenes of teleworking in public administration. Finally, the fourth part presents the theoretical as well as empirical implications concerning the effectiveness of teleworking in public administration.

2. Bibliometric analysis

To analyse the dimensions indicated in the literature, we conducted a bibliometric analysis. Based on the bibliometric analysis, the dimensions of telework in public administration were examined. Bibliometric analysis is a method that enables the determination of directions for further research based on statistical evaluation of data (Armfield et al., 2014). Furthermore, the bibliometric method provides insights into existing threads within the given areas (Opejin et al., 2020). It enables the identification of emerging scientific categories.

The bibliometric analysis was based on data from the Web of Science database. According to Clarivate, the Web of Science database is the most extensive database with citation indexing and research intelligence. We conducted the analysis in March 2021 and used the following terms: "teleworking" or "telecommuting" or "remote" and "public administration". We carried out searches of titles, abstracts and keywords for the words mentioned above. As a result, we obtained 260 publications, which constitute the research sample of the bibliometric analysis. We retrieved a list of publications meeting the criteria and then verified the data obtained from a bibliometric point of view: years of publication and

In order to analyse the co-occurring networks of terms in the reviewed papers, we used the VOSviewer software (Yu, Wang, Zhang, & Zhang, 2018). The following bibliometric analysis techniques were used: the method of co-occurrence of words and clustering (cluster analysis) as well as the mind mapping method. We analysed concepts that co-occurred at least 10 times based on their score of relevance. We then created a network map demonstrating the links between the terms.

2.1. Results of bibliometric analysis

The bibliometric analysis of remote work in public administration indicates a growing interest in this concept. Figure no. 1 shows the increasing frequency of publications relating to this topic. In 2001 this was just 7 publications, compared to 27 in 2021. The presented trend line indicates a growing interest in the issue of remote working in public administration.
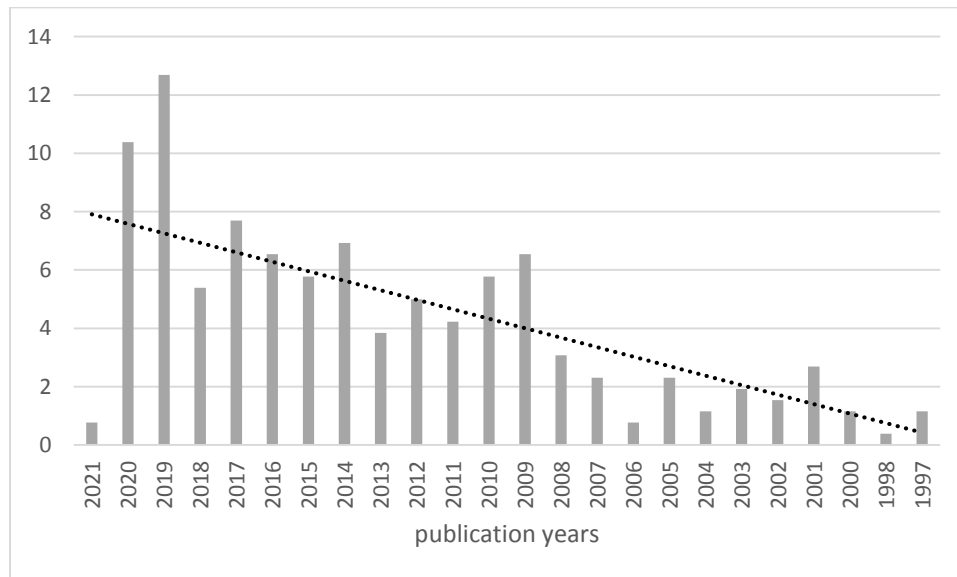

Figure 1. Annual publication trends

Figure 2, on the other hand, shows the regions with the highest number of published papers on work done in public administration. By far the largest number of publications relating to this issue have been carried out in the United States.
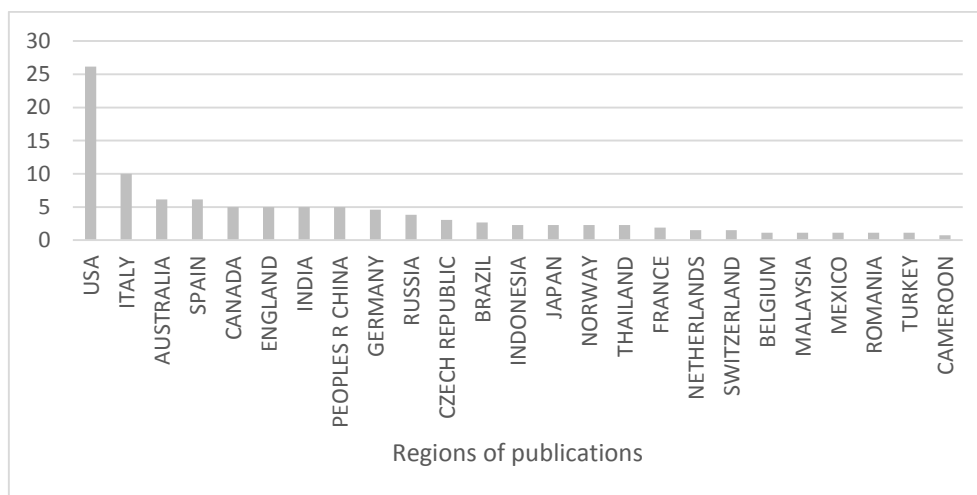

Figure 2. Regions of publication

2.2. Term Co-Occurrence Network Map

The next stage was a co-occurrence analysis of words. Words with less than 10 co-occurrences were excluded. The remaining terms were manually analysed to remove words related to the research process (for example: data, sample, survey). Only terms with

an relevance higher than 60% were taken into account. The analysis resulted in 35 words with 503 associations, which formed 3 clusters. Figure 3 shows the relevant terms within the co-occurrence network.
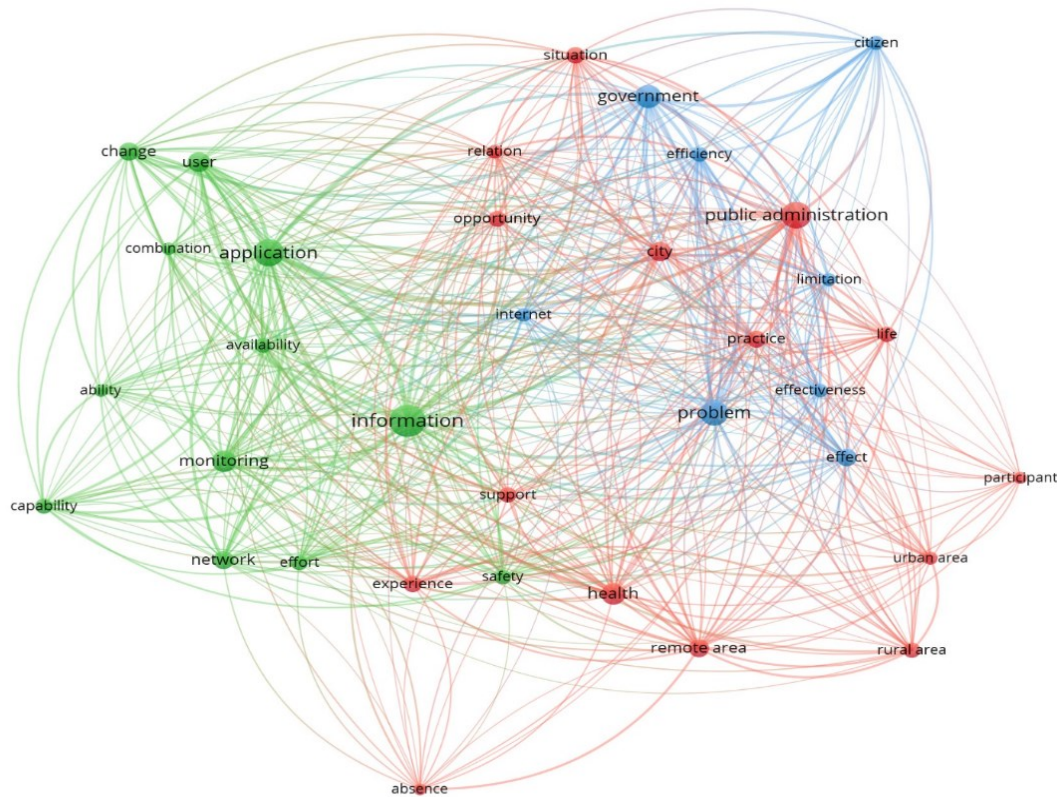

Figure 3. Network of terms from publication abstracts, title and key words. Source: Authors' Vosviewer analysis

The next step was a visual analysis. Verification of the network of terms reveals potential links, clusters themes and identifies research gaps. In the visualisation above, the size of the nodes indicates the strength of the links between the different terms. In turn, the thickness of the threads that connect each node illustrates the number of direct links: publications using both terms. VOSviewer assigns individual nodes to clusters. Clusters are closely related nodes. In Figure Z, the clusters are presented using colours. In this study, the terms were divided into three clusters. VOSviewer assigns individual nodes to clusters. Clusters are closely related nodes. In Figure Z, the clusters are presented using colours. In this study, the terms were divided into three clusters. The **red** cluster is oriented around relationships. Concepts such as relation, network, participation, support, experience are included in this cluster. The relationship cluster refers to the broadly understood relationship level: both in the organisation and in society. It refers to the relationship of a remote public administration to its stakeholders. The next, **green**, cluster contains terms relating to the competence of remote public administration. It includes the following terms: ability, application, capability, effort, information, monitoring and network. The green cluster comprises those aspects of the functioning of the remote public administration that relate to skills and competencies. The **red** cluster encompasses aspects

concerning the effectiveness of public administration. In the third cluster the concepts of efficiency, effectiveness and effects are included as well as problems. In this cluster the factors indicating the effectiveness of remote public administration are highlighted.

By analysing the network map, three areas related to remote public administration were identified: the relationship area, the competence area and the effectiveness area. The **relationship dimension** is concentrated around public administration. Such connections suggest that the relationship between inter stakeholders is a core aspect of the functioning of a remote public administration. Then, in the **competence dimension**, information and application take centre place. This seems to demonstrate the key role of information and data transfer in remote public administration. Whereas in the **effectiveness dimension** the concepts are oriented around the problem. This may indicate that the effectiveness of the work carried out in public administration is oriented around challenges and issues that require effective solutions. The above bibliometric analysis highlights three strands of research on remote work done in public administration.

The efficiency strand is related to the body of research focusing on the analysis of remote working in public administration, such as the study by Allen et al. (Allen et al., 2015) or Park et al. (Park, Kwon, Jun, Jung, & Kwon, 2020). Indeed, such studies address the challenges of ensuring effective outcomes of remote work in public administration (Caillier, 2013). This field examines the optimal management of remote workers in public administration (Kim et al., 2021) as well as organisational culture in shaping teleworker satisfaction (Kwon, & Jeon, 2020). Finally, this dimension of effectiveness also applies to research analysing the consequences of the Covid-19 pandemic on the effectiveness of remote work in public administration (Schuster et al., 2020).

3. Teleworking in public administration

Teleworking offers significant benefits to both employers and employees, as well as to the community and society. Among the benefits of teleworking for organizations are (Overmyer, 2011):

- continuity of operations,
- employee retention,
- real estate cost savings,
- improved employee productivity,
- increased organizational flexibility,
- reduced health care costs,
- accommodation for peoples with disabilities,
- expanded talent pool.

The benefits of teleworking for employees are indicated:

- work-life balance,

- increased personal flexibility,

- employee satisfaction,

- fewer sick days.

Among the benefits of teleworking for society are:

- increase demand for goods and services,

- reduced dependence on foreign sources of oil and reduced greenhouse emissions,

- on-site energy savings.

Teleworking does present unique managerial, organizational, and cultural issues to public administration entities, which often result in challenges facing successful implementation. Early efforts to implementation teleworking in public administration entities was to specifically address barriers to implementation related to the information technology (IT) needed to provide teleworkers with an effective work environment in the home, and to maintain connectivity with the office. It is recommended, therefore, IT support for home-based telework should be addressed at an enterprise level to ensure successful delivery of IT capabilities to employees, and that as telework expands to become an important alternative for most or all employees, IT management must play a greater role in planning and implementation support to ensure these employees have the IT capabilities necessary to perform their jobs.

The most frequently reported barrier in the survey of teleworking was[1]:

- data security,

- funding for equipment and information technology (IT),

- management resistance,

- organizational culture,

- office coverage challenges.

In the early period of implementing teleworking public administration entities reported having addressed these barriers in the following ways[2]:

- provided training to employees and managers on telework,

- increased their budgets for IT support,

- initiated marketing of telework through promotional materials,

- undertook initiatives to gain top management support of telework,

- established regular reporting mechanisms for tracking teleworkers.

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[1] https://www.telework.gov/reports-studies/reports-to-congress/2004-report-to-congress.pdf.
[2] Ibidem.

Actions being taken to identify and eliminate barriers in more mature public administration entities included the following[3]:

- updating policy/guidance,
- improving data reporting and tracking,
- improving program communication efforts,
- improving agency work culture,
- emphasizing telework availability during recruitment/onboarding,
- providing training for managers and/or employees
- encouraging telework when applicable or appropriate.

In summary, the implementation of remote work practices requires both barriers and benefits to be taken into account. The most significant barriers to the implementation of teleworking solutions relate to both technological and organizational aspects.

4. Research methodology

In the article we present the results of research carried out as part of the project Mazovia 2.0 "Sustainable development of the Mazowieckie Voivodeship in the new system of NUTS 2 and NUTS 3 units. Metropolitan, regional and subregional level" (Mazovia_2.0 pt. Zrównoważony rozwój województwa mazowieckiego w nowym układzie jednostek NUTS 2 i NUTS 3. Poziom metropolitalny, regionalny i subregionalnym) financed by National Centre for Research and Development (NCBIR), as part of the program GOSPOSTRATEG. The data collection was conducted with the use of the Computer-Assisted Web Interview (CAWI) method. **CAWI** method is dedicated to the study of the populations or groups of respondents represented by an excessively dispersed sample, characterized by a homogeneous conjunction of socio-demographic features. This method is widely used in social research for many reasons. Firstly, it ensures accessibility to selected groups of respondents with precisely defined predispositions and properties (e.g. e-administration entities). Secondly, online surveys make it possible to use research tools of greater logical complexity. Thirdly, this technique enables tests to be carried out quickly – preliminary results are available even 2-3 days after starting the test. Fourthly, CAWI generates relatively low costs (compared to PAPI or CAPI), which results from the lack of: interviewers and remuneration for them, the need to print and send materials or other additional work indirectly related to the research (e.g. interviewer training). Fifthly, CAWI provides a high degree of control over the research process. The lack of information delays (all data is immediately available, because it goes directly to the server) allows to control the quality, number and type of unit measurements on an ongoing basis, and to determine the

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[3] Ibidem.

degree of data deficiencies, and to react to any anomalies on an ongoing basis. The CAWI survey was carried out by the Research and Analysis Department of CZIiTT PW in cooperation with the Marshal's Office of the Mazowieckie Voivodeship and the Warsaw School of Economics. The research implementation period is May-June 2020. 314 local government entities from the Mazowieckie Voivodeship were invited to the research. We obtained the completed questionnaires from 136 entities. This means that the level of return obtained by us is 43%.

5. Results

One-fifth of the surveyed entities declared full possibility to perform the teleworking. In the same number of entities, about half of the employees were able to teleworking. In the remaining group of surveyed entities, several employees or none of them had the possibility to perform the teleworking (table 1).

Table 1.
Possibility of teleworking

Most of the employees had the possibility to perform the teleworking	22%
About half of the workers had the possibility to perform the teleworking	22%
Few of the workers had the possibility to perform the teleworking	33%
There was no possibility to perform the teleworking	22%
Hard to say	1%
Total	100%

If there was no possibility to perform the teleworking in a given unit, it was most often due to the need for the physical presence of employees at the workplace, because only in this way they could provide services and carry out tasks. For about 40% of entities, the inability or limited availability of teleworking resulted from a lack hardware and/or software. In 25% of entities, it was pointed to insufficient number of e-services offered to residents and entrepreneurs. This reason was closely related to the aforementioned the need to be physically at the workplace to provide services and carry out tasks. Insufficient number of e-services necessitated the physical presence of employees at the workplace. Behavioral factors such as lack of experience and/or insufficient digital competences and/or reluctance of employees close the list of reasons for the inability or limited availability of teleworking (table 2).

Table 2.
Why there was no possibility or only some employees could perform the teleworking*

Reason	%
The need to be physically at the workplace to provide services and carry out tasks	76
Lack of hardware enabling teleworking	41
Lack of software enabling teleworking	40
Insufficient number of e-services offered to residents and entrepreneurs	25
Lack of the regulation governing teleworking	25
Lack of experience in teleworking	22
Insufficient digital competences among employees for teleworking	7
Reluctance of employees for teleworking	5
Reluctance of the entity's authorities for teleworking	4
Others	5
Hard to say	3

* the respondent had the opportunity to indicate more than one reason.

In 61% of entities, the effectiveness of teleworking was assessed as comparable to stationary work. At the same time, 25% of the entities rated it as lower than during stationary work. A small number of entities claim that the effectiveness of teleworking was much higher or higher than during stationary work (table 3).

Table 3.
The effectiveness of teleworking

It was much higher than during stationary work	2%
It was higher than during stationary work	2%
It was at a similar level to that of stationary work	61%
It was lower than during stationary work	25%
It was much lower than during stationary work	0%
Hard to say	10%
Total	100,0%

Barriers to teleworking effectiveness were assessed by the entities using a 5-point Likert scale (where 1 = lack of impact, 3 = hard to say and 5 = high impact). No access to documents stored in the unit needed for teleworking was mentioned as the most important barriers to the effectiveness. Another highly impacted barriers was the lack of hardware and software enabling teleworking. As well as insufficient experience in teleworking among employees and insufficient number of e-services provided remotely (table 4).

Table 4.
Barriers to the effectiveness of teleworking

Barriers	1	2	3	4	5
Insufficient access to software dedicated to teleworking	21%	7%	7%	21%	43%
Lack of hardware enabling teleworking	13%	0%	7%	33%	47%
No access to documents stored in the unit needed for teleworking	0%	0%	0%	27%	73%
Insufficient experience in teleworking among employees	21%	14%	7%	29%	29%
The way in which teleworking was organized	8%	8%	69%	8%	8%
Employees' insufficient skills in operating teleworking software	8%	23%	54%	8%	8%
Insufficient number of e-services provided remotely addressed to residents, entrepreneurs, etc.	7%	7%	21%	43%	21%
No access to the central/internal server of the unit	36%	0%	7%	29%	29%

6. Discussion

This paper explores the issue of remote working effectiveness in public administration. Based on bibliometric analysis and verification of empirical data, several conclusions were drawn.

First, an analysis of the literature examining remote working in public administration confirmed three main strands of research: initially, an analysis of the literature examining remote working in public administration confirmed three main areas of research: one concerning the competences of administration (Kwon & Jeon, 2017), the second related to relationships (Coelho, Faiad, Rego, & Ramos, 2020), and the third focused on the efficiency of public administration (Reina, & Scarozza, 2021; Sousa, 2020). The research presented in this paper is in line with the trend to analyze effectiveness in administration.

Secondly, the presented research indicates the most significant barriers to the effectiveness of telework in public administration. The main barrier to the effectiveness of remote working in the surveyed offices was the lack of telecommuting possibilities. Respondents indicated that technological barriers and lack of availability of appropriate technology were the main obstacle. Moreover, another significant barrier to the implementation of teleworking in the surveyed offices was the absence of availability of e-services. This is in accordance with other studies in this strand showing that not all public administration tasks can be carried out remotely Morilla-Luchena et al. (Morilla-Luchena, Muñoz-Moreno, Chaves-Montero, & Vázquez-Aguado, 2021). The outlined data show the challenges of insufficient digitization of services in the public sector. This is all the more important as previous studies have confirmed the positive impact of digitization on the effectiveness of public administration (Dobrolyubova, Klochkova, & Alexandrov, 2019). Therefore, the strengthening of activities aimed at improving the digitalization of public administration, both by making e-services available and by providing employees with appropriate technology, is a key challenge for public administration.

This enhancement of the digitalisation of existing e-government services will greatly contribute to increasing the availability of remote working for public administration employees. For example, research from 2011 shows that as many as 36% of employees declared that they cannot work remotely because they need to be physically present at work (Mahler, 2012). Thus, the implementation of remote work requires a wide-ranging effort, including changes in public policy.

The third aspect presented in this research is the perception of remote public administration effectiveness by their employees. The majority of the respondents evaluate the performance of tasks during remote work well. Especially in light of previous studies that indicate reduced commitment and negative perceptions of the tasks performed in teleworking (de Vries, Tummers, & Bekkers, 2019), this represents a positive finding. The surveyed civil servants rated their performance in teleworking at a comparable level to that of stationary work.

This is a valuable indication regarding the positive perception of remote work in public administration. The literature emphasizes that willingness to work remotely is a prerequisite for ensuring operational continuity.

The experience of the last year has shown that in order to maintain the continuity of local governments entities need to enable their employees to work remotely, which involves overcoming many technological barriers However, it is also important to remember that the essence of successful teleworking solutions is more a function of leadership than technology. Teleworking is not simply a new way of assigning work, but creates a new organizational form with different ways of defining tasks, more complex integration problems and different management responsibilities (Offstein et al., 2010).

7. Conclusion

The presented results indicated the most important barriers in the implementation of remote working in public administration. The results also showed the directions of further development of e-administration by increasing the level of digitalisation of services and providing employees with access to technological infrastructure. Public administration should strengthen the digital competencies of its employees, subsidise the purchase of necessary equipment and expand the spectrum of e-services offered. In addition, this article presents a new approach to teleworking performance in public administration by relating the empirical research to the research stream focusing on the effectiveness of administration.

The main limitation of the conducted research was a small research sample limited to units from one province. This research should be extended and deepened. The limitation of the study was also that these results are probably not representative. The survey was conducted in the Mazowieckie voivodship, and according to the government data it is the richest voivodship in Poland. Presumably, the situation in the other voivodships will be even more difficult. However, this requires further investigation.

Teleworking, long practised in the private sector, has a number of advantages, from increased productivity to reduced environmental costs for society. Local governments entities are the first responders in times of any problems of local individuals and communities. The situation with the COVID-19 pandemic and the reduction in personal contacts between people has resulted in a significant reduction in access to services provided by these entities. The limitation in access to these services was a consequence of many factors, but in particular, it was related to the insufficient number of services offered remotely to local individuals and communities, but also to the insufficient preparation of these units to work remotely.

This article aims to inspire discussion on further directions necessary for the effective implementation of remote work in public administration.

References

1. Allen, T.D., Golden, T.D., & Shockley, K.M. (2015). How effective is telecommuting? Assessing the status of our scientific findings. *Psychological Science in the Public Interest,* https://doi.org/10.1177/1529100615593273.

2. Andrey, J.C., Burns, K.R., & Doherty, S.T. (2004). Toward sustainable trasportation: Exploring transportation decision making in teleworking households in a mid-sized Canadian city. *Canadian Journal of Urban Research*.

3. Armfield, N.R., Edirippulige, S., Caffery, L.J., Bradford, N.K., Grey, J.W., & Smith, A.C. (2014). Telemedicine - A bibliometric and content analysis of 17,932 publication records. *International Journal of Medical Informatics,* https://doi.org/10.1016/j.ijmedinf. 2014.07.001.

4. Bae, K. Bin, & Kim, D. (2016). The Impact of Decoupling of Telework on Job Satisfaction in U.S. Federal Agencies: Does Gender Matter? *American Review of Public Administration,* https://doi.org/10.1177/0275074016637183.

5. Caillier, J.G. (2013). Are Teleworkers Less Likely to Report Leave Intentions in the United States Federal Government Than Non-teleworkers Are? *American Review of Public Administration,* https://doi.org/10.1177/0275074011425084.

6. Caillier, J.G. (2016). Does Satisfaction with Family-Friendly Programs Reduce Turnover? A Panel Study Conducted in U.S. Federal Agencies. *Public Personnel Management,* https://doi.org/10.1177/0091026016652424.

7. Choi, S. (2018). Managing Flexible Work Arrangements in Government: Testing the Effects of Institutional and Managerial Support. *Public Personnel Management,* https://doi.org/10.1177/0091026017738540.

8. Coelho, F.A., Faiad, C., Rego, M.C.B., & Ramos, W.M. (2020). What Brazilian workers think about flexible work and telework? *International Journal of Business Excellence,* https://doi.org/10.1504/IJBEX.2020.104842.

9. de Vries, H., Tummers, L., & Bekkers, V. (2019). The Benefits of Teleworking in the Public Sector: Reality or Rhetoric? *Review of Public Personnel Administration,* https://doi.org/10.1177/0734371X18760124.

10. Dobrolyubova, E., Klochkova, E., & Alexandrov, O. (2019). Digitalization and Effective Government: What Is the Cause and What Is the Effect? *Communications in Computer and Information Science,* https://doi.org/10.1007/978-3-030-37858-5_5.

11. Kim, T., Mullins, L.B., & Yoon, T. (2021). Supervision of Telework: A Key to Organizational Performance. *The American Review of Public Administration,* https://doi.org/10.1177/0275074021992058.

12. Kwon, M., & Jeon, S.H. (2017). Why Permit Telework? Exploring the Determinants of California City Governments' Decisions to Permit Telework. *Public Personnel Managemen,* https://doi.org/10.1177/0091026017717240.

13. Kwon, M., & Jeon, S.H. (2020). Do Leadership Commitment and Performance-Oriented Culture Matter for Federal Teleworker Satisfaction With Telework Programs? *Review of Public Personnel Administration,* https://doi.org/10.1177/0734371X18776049.

14. Mahler, J. (2012). The Telework Divide: Managerial and Personnel Challenges of Telework. *Review of Public Personnel Administration,* https://doi.org/10.1177/0734371X12458127.

15. Morilla-Luchena, A., Muñoz-Moreno, R., Chaves-Montero, A., & Vázquez-Aguado, O. (2021). Telework and social services in Spain during the COVID-19 pandemic. *International Journal of Environmental Research and Public Health,* https://doi.org/10.3390/ijerph18020725.

16. Offstein, E.H., Morwick, J.M., & Koskinen, L. (2010). Making telework work: leading people and leveraging technology for competitive advantage. *Strategic HR Review, 9(2),* https://doi.org/10.1108/14754391011022244.

17. Opejin, A.K., Aggarwal, R.M., White, D.D., Jones, J.L., Maciejewski, R., Mascaro, G., & Sarjoughian, H.S. (2020). A bibliometric analysis of food-energy-water nexus literature. *Sustainability (Switzerland),* https://doi.org/10.3390/su12031112.

18. Overmyer, S.P. (2011). *Implementing telework: Lessons learned from four federal agencies.* Arlington, VA: IBM Center for the Business of Government, http://www.businessofgovernment.org/sites/default/files/Overmyer.pdf, 8th of May 2021.

19. Park, H.-Y., Kwon, Y.-M., Jun, H.-R., Jung, S.-E., & Kwon, S.-Y. (2020). Satisfaction Survey of Patients and Medical Staff for Telephone-Based Telemedicine During Hospital Closing Due to COVID-19 Transmission. *Telemedicine and E-Health,* https://doi.org/10.1089/tmj.2020.0369.

20. Pérez, M.P., Sánchez, A.M., De Luis Carnicer, M.P., & Jiménez, M.J.V. (2004). The environmental impacts of teleworking: A model of urban analysis and a case study. *Management of Environmental Quality: An International Journal,* https://doi.org/10.1108/14777830410560728.

21. Reina, R., & Scarozza, D. (2021). Human Resource Management in the Public Administration. *Organizational Development in Public Administration,* https://doi.org/10.1007/978-3-030-43799-2_3.

22. Schuster, C., Weitzman, L., Sass Mikkelsen, K., Meyer-Sahling, J., Bersch, K., Fukuyama, F., Kay, K. (2020). Responding to COVID-19 through Surveys of Public Servants. *Public Administration Review,* https://doi.org/10.1111/puar.13246.

23. Sousa, M.J. (2020). HRD as the Epicentre of Governance in Public Administration. *The Future of HRD, Volume II,* https://doi.org/10.1007/978-3-030-52459-3_2.

24. Yu, D., Wang, W., Zhang, W., & Zhang, S. (2018). A bibliometric analysis of research on multiple criteria decision making. *Current Science,* https://doi.org/10.18520/cs/v114/i04/747-758.