Evaluation of Project Work in Public Administrations in E-government and Digitization Projects in Germany

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Abstract: Particularly in times of crisis, it is apparent that the digital transformation in Germany has not yet progressed far enough. Public administrations are confronted with legally prescribed obligations to implement e-government and digitization projects in the near future. Project work and the involvement of users in the implementation are increasingly coming into focus. The objective of this paper is to identify the challenges in project work in the context of the implementation of e-government and digitalization projects in public administration. This was done by comparing survey results from 2018 and 2021 and analyzing whether agility can make a decisive contribution to eliminating these challenges. Moreover, it was investigated whether user involvement in implementation is already taking place. This study was conducted for the first time in 2018 and again in 2021 using an online survey. The two samples of the questionnaire study (2018 and 2021) show, that public administrations are increasingly coming into contact with agile methods. Furthermore, challenges were identified that limit improved project work in public administrations and that need to be addressed.

1 INTRODUCTION

In 2013, the law for the improvement of electronic administration (*E-Government Gesetz;* e-government law) came into force in Germany, with the aim of offering simpler, more user-friendly, and more efficient electronic administrative services. Both the implementation obligations of the e-government law and the advancing digital transformation are leading to changed processes in administrations. Governments need to adapt to changes in both their internal and external environments, and in response public administrations are adopting agile approaches as part of their process design, project management, and software development approaches (Mergel et al., 2018).

In a survey of public administration project work in e-government and digitization projects conducted back in 2018 it was shown that project teams in German public administrations face various challenges (Looks et al., 2018), such as a strict hierarchy among the employees working in the public administration, no involvement of users in e-government and digitization projects, as well as insufficient communication. Based on the challenges identified in the survey in 2018, it has already been suggested that agility can be a suitable approach to overcome the issues by mapping the challenges to defined dimensions of agility (Looks et al., 2019).

Legal requirements and the prevailing Covid-19 pandemic, as well as the associated work situation, have forced public administrations to accelerate the implementation of their e-government and digitization projects. The way public administration employees work is changing and it is no longer

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limited, for example, to just processing applications, but also involves working on digitization projects.

The objective of this paper is to obtain a comparison of the prevailing challenges with regard to project work in digitization projects in public administration and to analyze, whether agile methods have been increasingly used in public administration in 2021 compared to 2018. Furthermore, if agile methods are increasingly used, it will be examined what effect they achieve.

The paper is structured as follows: In Section 2 the research objectives and research questions are outlined. In Section 3 the main findings of the study are summarized, and a comparison is shown of the results from 2018 and 2021, and thus whether an agile way of working has entered public administrations. In Section 4 the significance of the results and the limitations of this study are discussed. Finally, in Section 5 a summary of the findings and outlines for future research based on these are presented.

2 RESEARCH METHOD

With the help of the survey results, the following three research questions (*RQ*) were answered:

RQ1: "*Has there been a change of the challenges faced by project members in public administrations with regard to implementing e-government and digitization projects in 2021 compared to 2018?*"
RQ2: "*Has an agile way of working entered public administrations?*"
RQ3: "*Has the pandemic situation had an influence on the work in public administrations?*"

To answer the research questions *RQ1* and *RQ2*, the same questionnaire as used in 2018 was reused. Repeating the survey allows a direct comparison of the results (*RQ1*). An analysis of the results in terms of agility contributes to the answering of research question *RQ2*. Due to the prevalence of the Covid-19 pandemic, a section of questions was added to the 2018 questionnaire in order to analyze the impact of the pandemic on work within public administrations (*RQ3*). These questions were also used to determine whether only single aspects changed or whether a shift in agile values had been perceived. In the summer/autumn of 2021 when the survey was conducted, the Covid-19 pandemic had been prevalent for more than a year, so it was assumed that a change could have already taken place.

To conduct this study, a new sample of the online survey study from 2018 was set up (Looks et al., 2018). The design of the questionnaire was based on the relevant design guidelines for the construction and evaluation of questionnaires (Kallus, 2016; Kirchhoff et al., 2010; Porst, 1998). In 2018, 18 items were developed as a mixture of open, semi-open and closed questions. A total of 4 items were added for the renewed survey in 2021. In one item it was asked in what type of administration the participant works, to see if the types of administrations have an influence on the way of working. Another 3 items were added to identify pandemic related changes. This makes a total of 22 items for the survey in 2021. As in 2018, employees in public administrations were defined as the target group for the survey. In 2018, 38 employees from different public administrations participated. In 2021, a total of 51 employees from different types of public administrations filled out the questionnaire to the end, so that their information was included in the evaluation. The participants were at the time employed in municipal, district, federal, and state administrations. The question of the type of administration was only added in 2021 so it is not possible to compare the 2018 sample regarding this aspect. In 2021, the majority of respondents had at the time worked in a public administration for less than three years (n = 29; 56.9 %). Accordingly, only a few participants had worked on more than six projects (n = 20; 38.2 %). Most survey participants worked in IT (n = 22; 43.1 %). Compared to 2018 (n = 38), the sample of the 2021 survey had been working in public administration for a significantly shorter period of time (>10 years: n= 18; 47.4 %). The level of project experience can be classified as similar between the surveys (>6 years: n = 15; 39.5 %), with the proportion of those who had not yet worked on a project dropping from 18.4 % to 7.8 %. Again, in 2018, the largest share of survey participants came from IT (n = 20; 52.6 %).

Participants in 2021 were recruited both via business social networks, and by contacting various administrations in Germany directly and asking them to take part in the survey. Due to the preservation of anonymity, it is not possible to trace from which cities within Germany the participants originate. The recruitment process was similar in 2018. The survey was conducted in the period from 2021/07/13 to 2021/11/12.

To test for significant differences between groups, t-tests for independent samples were used. Significance was tested on a $p = 0.05$ level. Though the study was conducted in 2018 and in 2021 independent samples were assumed, since the same groups were not addressed specifically. Pearson correlation coefficients are reported for the relation

between the factors influenced by the Covid-19 pandemic (RQ3) to show, whether an improvement or deterioration in one aspect is accompanied by the same direction on another aspect.

3 RESULTS

With regard to the previously defined research questions *RQ1* and *RQ2*, the results of the survey will be used to determine whether the implementation of e-government and digitization projects in public administrations has changed, and whether project staff face different challenges in implementing these projects than they did in 2018. Furthermore, the aim is to work out whether the prevailing Covid-19 pandemic has had an impact on collaboration in public administration (*RQ3*). In order to determine whether there is a difference between groups with and without experience of agile methods in 2021, the participants who answered the item with "*yes*" or "*partly*" were combined into the group "*with experience with agile methods*" for the evaluations. Participants who answered "*no*" to the item formed the group "*without experience with agile methods*". Participants who did not or could not answer the question were excluded from these evaluations.

3.1 Experience with Agile Methods in Public Administration

In Table 1 a comparison is shown of participants' experience with agile methods in public administration in 2018 and 2021. 66 % of the participants in 2021 had worked partly (n = 14) or fully with agile methods (n = 19). In 2018, only 41 % made this statement. The number of those who could not or did not want to make a statement also decreased from n = 4 to n = 1.

Table 1: Comparison of experience with agile methods 2018 and 2021.

	2018	2021
	100 % (n = 34)	100 % (n = 50) (100 %)
yes	14.7 % (5)	19 (38.0 %) (19)
partly	26.5 % (9)	14 (28.0 %) (14)
no	58.8 % (20)	17 (34.0 % (17))

No information for 4 participants in 2018.
No information for 1 participant in 2021.

In 2021, agile methods were still primarily used in IT in public administrations (see Table 2). Among the respondents, 14 employees from IT stated that they had already worked with agile methods. Survey participants who worked in specialist departments/offices (n = 4) had not yet worked with agile methods at all. Among the surveyed employees from organizational departments (n = 10), agile methods were also used by only 3 participants.

Table 2: Comparison of experience with agile methods by organizational unit 2021.

	IT	specialist department / office	Organi-zational department	other
	44.0 % (n = 22)	8.0 % (n = 4)	20 % (n = 10)	28.0 % (n = 14)
yes	50.0 % (11)	0.0 % (0)	30.0 % (3)	35.7 % (5)
partly	36.4 % (8)	0.0 % (0)	0.0 % (0)	42.9 % (6)
no	13.6 % (3)	100.0 % (4)	70.0 % (7)	21.4 % (3)

No information for 1 participant.

3.2 Cross-functional Collaboration

A large spectrum of competences within a team favors a self-organized distribution of task packages according to the pull principle (Anderson et al., 2015). Agile process models such as Scrum rely on the fact that teams are structured in an interdisciplinary way. The members of a team thus have all the skills that are required to accomplish the work (Schwaber and Sutherland, 2020).

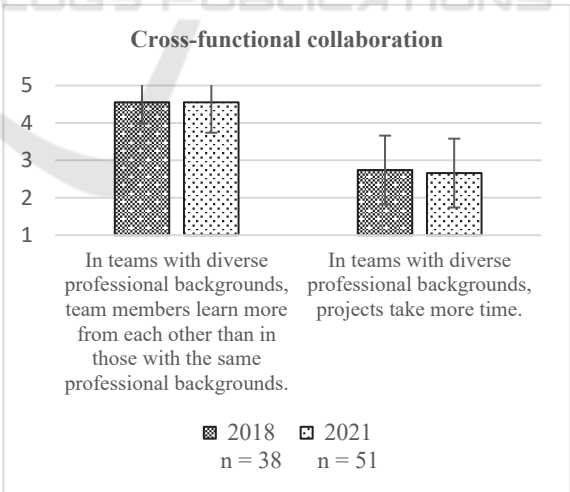


Figure 1: Comparison of cross-functional work 2018 and 2021 with 1 = do not agree at all and 5 = fully agree.

In Figure 1 a comparison related to the cross-functional work is shown of the years 2018 and 2021. There is no significant difference between 2018 and 2021 regarding the learning process in cross-

functional teams (t(87) = 0.00; p = 0.15) nor for the required time of a project (t(87) = 0.41; p = 0.20).

Compared to participants without experience of agile projects, those with agile project experience rate the learning potential of interdisciplinary teams as higher and tend to agree less with the statement that projects are delayed by interdisciplinary collaboration (see Figure 2). However, these differences are not significant (learning: t(48) = 1.20; p = 0.24; required time: t(48) = 1.17; p = 0.27).

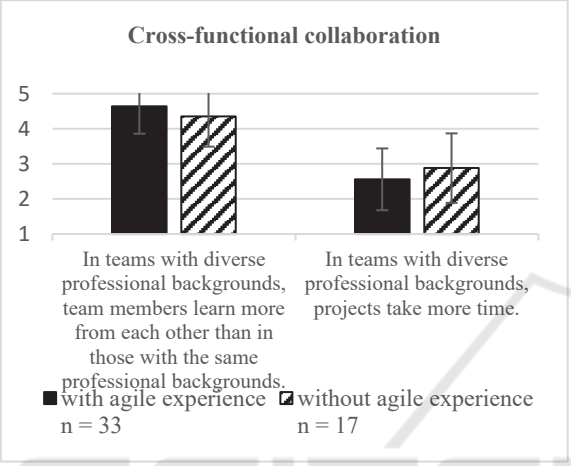


Figure 2: Comparison of cross-functional work between groups with and without agile experience 2021 with 1 = do not agree at all and 5 = fully agree.

3.3 User Involvement

The legally required implementation obligations of digital access for citizens mean that, due to the diversity of the target group, usability and user experience are an important component within these projects (Looks et al., 2019). Depending on the type of project, the users in the context of public administration are not only citizens, but also employees in public administration. Digitizing public administration means digitizing both internal and external administrative processes. This includes, for example, the introduction of an electronic file and thus a document management system.

The survey in 2018 showed the readiness of public administration employees to involve users in the implementation of e-government and digitization projects. As seen in Figure 3, it is the second most important requirement following a good functioning software. In 2021, it is rated as being even more important than a good functioning software and as important as an easily usable software. This makes it one of the two most important requirements among the examined criteria. Although user involvement was rated as more important in 2021 compared to 2018, the increase is not significant (t(87) = 1.80; p = 0.27), neither is the increase in the importance for usable nor good functioning software significant (usability: t(87) = 1.94; p = 0.29; functionality: t(87) = 1.01; p = 0.30).

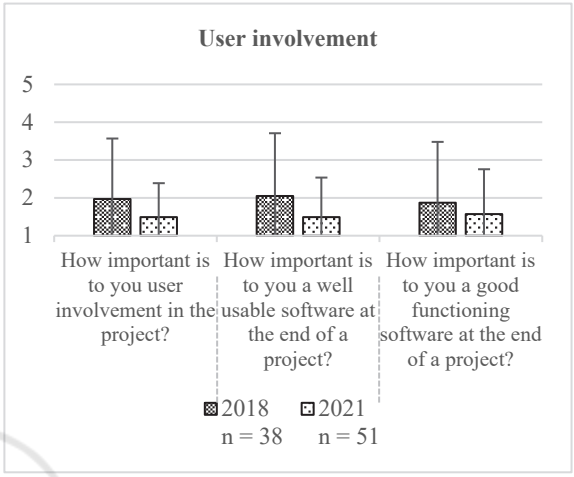
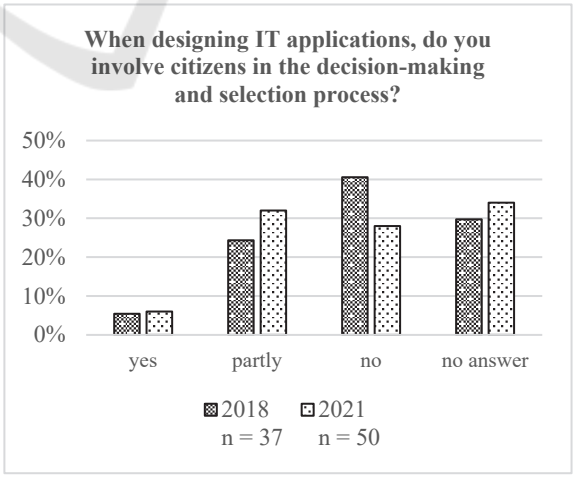


Figure 3: Comparison of user involvement 2018 and 2021 with 1 = very important and 7 = not very important.

Only 5 % (n = 2) of the respondents in 2018 stated that they actually involved users, another 24 % (n = 9) partly involved users. The reasons they gave for not involving users were, for example, there was no political will and that it was not considered important. In 2021, a slight increase in user involvement was seen (see Figure 4).



No information for 1 participant in 2018.
No information for 1 participant in 2021.

Figure 4: Comparison of user involvement 2021 and 2018.

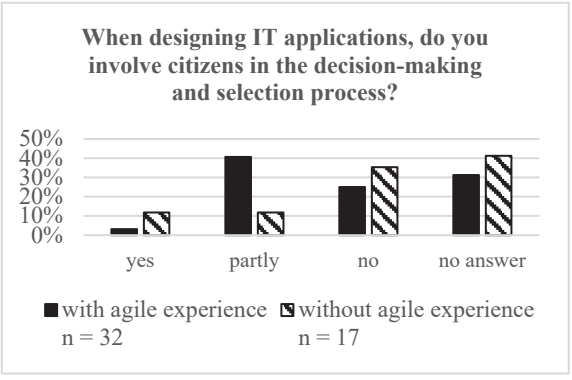
The results of the survey showed that although only 6 % (n = 3) involved users, another 32 % (n = 16) of respondents only partly involved users. Respondents gave various reasons for not involving users, for example, the time factor, the unrealistic and non-legislative wishes of users, and a lack of citizen communication.

In 2021, project members with agile project experience rated the involvement of users in the project as most important (m = 1.45; sd = 1.03) (see Table 3). For those without agile project experience, functioning software (m = 1.29; sd = 0.59) and usable software (m = 1.35; sd = 0.62) were rated as more important (see Figure 4). However, neither of these group differences are significant (user involvement: $t(48) = 0.53$; $p = 0.27$; usability: $t(48) = 0.73$; $p = 0.32$; functionality: $t(48) = 1.01$; $p = 0.41$).

Table 3: Comparison of user involvement between groups with and without agile experience 2021 with 1 = very important and 7 = not very important.

How important is to you…	with agile experience n = 33	without agile experience n = 17
	m (sd)	m (sd)
user involvement in the project?	1.45 (1.03)	1.59 (0.62)
a well usable software at the end of a project?	1.58 (1.25)	1.35 (0.49)
a good functioning software at the end of a project?	1.7 (1.40)	1.29 (0.59)

When the regularity of citizen participation in the design of IT applications was examined (see Figure 5), it was found that participants with agile experience, who rated this aspect as more important, involved or partly involved citizens more often than those without agile experience (with: 64 %; without: 40 %).



No information for 2 participants.

Figure 5: Comparison of citizen involvement between groups with and without agile experience 2021.

3.4 Project Failure

In 2018, 65.8 % (n = 25) of participants named "*insufficient human resources*", "*insufficient communication*" and "*unclear goals and requirements*" as the three main reasons for project failure. In 2021, respondents named "*unclear goals and requirements*" as the most frequent reason for project failure (n = 32; 62.7 %). With a total of 28 mentions (54.9 %), "*insufficient communication*", "*insufficient human resources*" and "*lack of transparency in responsibilities*" were the second most frequently given answers (see Figure 6).

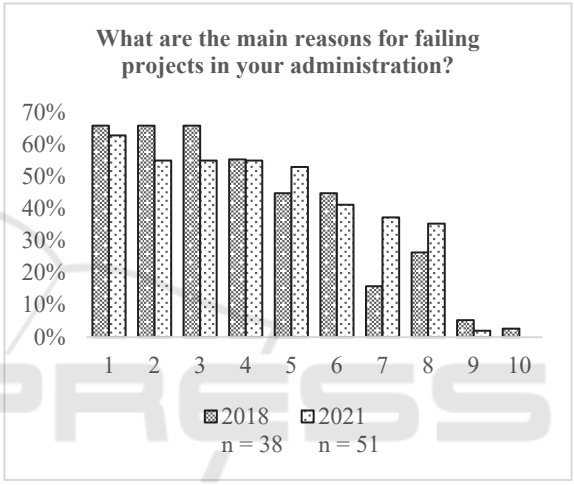


Figure 6: Comparison of reasons for failing projects 2021 and 2018 with 1: unclear goals and requirements; 2: insufficient communication; 3: insufficient human resources; 4: lack of transparency in responsibilities; 5: poor project management; 6: lack of management support; 7: legal regulations, politics; 8: insufficient commitment; 9: others; 10: no projects failing with us.

With regards to the groups with and without experience with agile projects, it can be seen that without such experience, "*unclear goals and requirements*" (n = 10; 58.8 %), "*lack of transparency in responsibilities*" (n = 9; 52.9 %) and "*poor project management*" (n = 8; 47.1 %) were mentioned as the most frequent reasons for project failure (see Figure 7). Respondents with agile project experience stated, "*unclear goals and requirements*" and "*insufficient human resources*" (n = 21; 63.6 %) as well as "*insufficient communication"* (n = 20; 60.6 %) as the most frequent reasons for project failure.

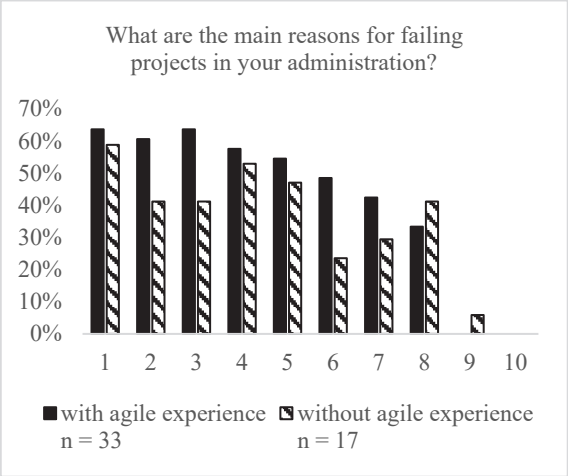


Figure 7: Comparison of the reasons for failing projects between groups with and without agile experience 2021 with 1: unclear goals and requirements; 2: insufficient communication; 3: insufficient human resources; 4: lack of transparency in responsibilities; 5: poor project management; 6: lack of management support; 7: legal regulations, politics; 8: insufficient commitment; 9: others; 10: no projects failing with us.

3.5 Covid-19 Pandemic Influence

The results of the three items regarding the Covid-19 pandemic showed that the degree of freedom for mobile working had at least remained the same, but had improved substantially on average (m = 1.92; sd = 1.10). No clear direction for a change was determined for all other questioned aspects (see Table 4).

Table 4: Covid-19 Pandemic influence on ways of working with -3 = strongly deteriorated and 3 = strongly improved.

	n	m	sd	min	max
option to work from home	49	1.92	1.096	0	3
my work efficiency	48	0.83	1.342	-2	3
acceptance of errors in projects	45	0.71	1.121	-3	3
mutual trust among colleagues	48	0.69	1.206	-2	3
work at eye level with my supervisor	46	0.39	0.954	-2	2
communication with my colleagues	48	0.29	1.271	-2	3
external influence on my thinking	44	0.25	0.751	-1	2
extent of documentation effort	46	0.09	0.812	-2	2
knowing what my colleagues are working on	48	0.00	1.272	-2	3
speed of completion of projects in my administration	44	-0.05	1.346	-3	3
problems due to misunderstandings in projects	46	-0.09	0.962	-3	2

If it is considered whether an improvement or a deterioration in one aspect of the ways of working is accompanied by an improvement or a deterioration in another aspect, then Table 5 shows that this is the case for 9 out of 11 factors. Correlations can be classified as medium (r > 0.3) to high (r > 0.5) (Cohen, 1988). Thus, it is possible to state that public administrations which show a development in agile values, are able to achieve this in more than one way.

Table 5: Pearson correlation coeffients between factors of the Covid-19 pandemic influence on working.

	1	2	3	4	5	6	7	8	9
1									
2									
3	0.33**	0.46**							
4	0.45**	0.36*	0.48**						
5	0.36*		0.43**	0.58**					
6	0.33*	0.33*		0.51**	0.57**				
7				0.36*	0.42**				
8		0.48**		0.41**	0.34*	0.42**	0.36*		
9				0.35*	0.34*	0.45**			
10	0.37*	0.49**	0.39**	0.69**	0.46**	0.67**	0.40**	0.48**	0.45**
11							0.31*	0.40**	

*. correlation significant at 0.05 level.
**. correlation significant at 0.10 level.
1: acceptance of errors in projects; 2: communication with my colleagues; 3: problems due to misunderstandings in projects; 4: work at eye level with my supervisor; 5: speed of completion of projects in my administration; 6: my work efficiency; 7: extent of documentation effort; 8: knowing what my colleagues are working on; 9: option to work from home; 10: mutual trust among colleagues; 11: external influence on my thinking.

4 DISCUSSION

In this section the significance of the findings will be discussed and the previously defined research questions answered. Furthermore, possible limitations of this study will be considered.

4.1 Meaning of Findings

The results of the repetition of the survey from 2018 in 2021 show some changes, compared to the previous one, in project implementation in public administrations for e-government and digitization projects. For instance, the results show that employees from public administrations are increasingly coming into contact with agile methods. In 2021, 66 % of respondents stated that they had already come into contact with agile methods and in 2018, this was only stated by 41.2 % of the participants in the survey. The presentation in Table 2 shows that agile methods are largely used by respondents who work in IT. The participants from specialist areas of public administration, on the other hand, have not yet come into contact with agile methods at all.

The success of digitization programs in Germany should not only be measured by whether all administrative services are available online, but also by their acceptance by the users. The goal in the implementation of the *Onlinezugangsgesetz* should be a paradigm shift that brings users to the center of attention. However, the results of the survey in 2021 do not show any increase in the involvement of users in the implementation of e-government and digitization projects. The reasons given by respondents for not involving users included the time factor, unrealistic user requests that do not comply with the law and a lack of citizen communication. Although the difficulties to involve users in development processes in times of social distancing during the Covid-19 pandemic has not explicitly been mentioned, this factor cannot be ruled out. Overall, however, user involvement is considered important.

A comparison of the results of the two surveys illustrates the increase in awareness of agile methods, but overall, no changes can be seen in the challenges facing public administrations in e-government and digitization projects. The will and willingness to work in an agile manner is still evident. This suggests that while methodological knowledge exists, a corresponding change in values has not yet taken place in order to overcome the challenges in project work already identified in 2018. Agility can be a key improvement factor for the challenges of project work in public administrations (Looks et al., 2019), but requires an agile value shift within the organization. With regard to the introduction of an agile way of working in public administration, the greatest priority should first be placed on communicating the agile mindset. In the past, it has already been shown that agile process models can be successfully applied in public administrations (Torrecilla-Salinas, 2013).

An examination of the influence of the Covid-19 pandemic on work showed that there was no uniform development across all the administrations surveyed. Instead, some administrations have used the situation as an opportunity and made improvements possible for their employees. Other administrations were unable to use this opportunity, which in some cases even led to a worsening of the experienced situation.

4.2 Limitations

It should be noted that the title of the survey "*Agile Administration*" led to a priming effect (Palmer, 1975), so that employees who had not previously come into contact with the term agility did not feel addressed. Furthermore, only project-related challenges were recorded, although the prevailing Covid-19 situation could also have influenced personal challenges that were not assessed. It was attempted to counteract any possible distortion of the results due to the influence of the Covid-19 pandemic by adding the supplemented Covid-19 pandemic question block.

Participants in the survey also indicated in the comment option at the end of the questionnaire that the wording of the item "*When designing IT applications for citizens, do you include them in the development and selection process?*" was strongly focused on public administrations that implement e-government and digitization projects for citizens, and that using "users" instead of "citizens" would be advisable. This aspect was already known in advance as it was a finding from the first survey, and should be investigated in future research, but was not adjusted to maintain comparability. It is also necessary to assume a large heterogeneity of the groups due to the small sample (n = 51). A larger sample would, therefore, have resulted in even stronger test results. In particular, the test results for group differences and correlations cannot be interpreted as a general trend.

5 CONCLUSION AND FUTURE RESEARCH

In this paper the results of two surveys from 2018 and 2021 were compared. These surveys were used to analyze the project work in public administrations with regard to the implementation of e-government and digitalization projects. The changes in working

methods and the opportunities arising from the digitalization of administrative processes are paving the way for a different type of project organization. The trend is now moving away from a pattern of pure responsibility thinking towards the usage of interdisciplinary teams. From the identified challenges from the 2018 survey, it could already deduced that the agile approach can be a suitable method to improve project work (Looks et al., 2019). The results of the survey conducted in 2021 show an increase in the awareness of agile methods, but a comparison of the survey results does not show any distinction in terms of the challenges faced by public administration project staff with regard to the implementation of e-government and digitization projects. In both surveys, respondents cited "*insufficient human resources*" and "*insufficient communication*" as the main reasons for project failures. Based on the analysis of the identified challenges during the implementation of e-government and digitization projects in public administration from the survey in 2018 and an allocation of these challenges to defined dimensions of agility, it has already been shown that agility can contribute to overcoming these challenges (Looks et al., 2019). However, the exclusive application of agile methods did not lead to the desired results, as there was still in 2021 no discernible change in values within public administration and the same challenges continue to be identified within the projects.

In further research projects, the questionnaire used will be optimized in a first step in light of the findings from the previous surveys. One future aim is to use the questionnaire in different countries in order to be able to derive Europe-wide comparisons with regard to the challenges of project work in public administrations. The next studies will be conducted in Spain and Poland. Based on the identified challenges, an already defined prototypical process model used for supporting agile transformation in public administrations (Fangmann et al., 2020; Looks et al., 2021) will be optimized in the future. This will be done in order to achieve both a targeted use of agile methods in public administrations as well as a change in values so the agile transformation can progress. It will also be assessed whether the application of agile methods leads to a higher project success rate.

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