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Investigating Change Management Based on Participation and Acceptance of IT in the Public Sector:
A Mixed Research Study

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ABSTRACT

The digitalization of public administrations faces big challenges regarding employees' acceptance of IT. Change management approaches based on participation should help achieving acceptance and success of IT projects in the public sector. The research investigated how participation methods can be integrated into change management and which effects participation has on the acceptance of the introduced system in this sector. The authors followed a mixed research approach and conducted a quantitative and a qualitative study within public administrations and ministries in two states in Germany. The findings reveal that employees' participation in the form of information, communication, training, support, and active participation as well as the role of managers all have a significant positive relationship with employees' attitudes towards IT. Furthermore, they identified four key aspects of applying change-management based on employee participation in IT-projects, which they recommend to consider when implementing IT projects in the public sector in the future.

KEYWORDS

Acceptance, Adoption, Change Management, Digitalization, Employees, IT Project, Participation, Public Administration

INTRODUCTION

Public administrations in Germany are undergoing a structural and technological change. The strategy and several measures for managing this change are defined within the e-government act (EGovG) and the online access act (OZG) of the federal government, as well as in the jurisdiction of the individual federal states. Currently the online access act contains 575 public administrative processes that have to be changed, in order to modernize and digitalize the German public administrative system. A key action for managing these changes is the process assessment and the subsequent optimization of administrative business processes. This can be seen as a prerequisite for a full digitalization of government processes. Based on these legally binding changes, the work routines of administrative staff will also change as a result of rising restructuring activities. Digitalization changes such as these present a considerable challenge for public administrations (Van der Voet, Kuipers, & Groeneveld, 2016). The implementation of these changes in the form of IT projects should ideally focus on the fulfilment of the requirements set by the e-government act, but should also consider the affected

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employees. However, employees resistance to change is still one of the major problems facing the implementation of IT innovations in the public sector (Basyal & Seo, 2017). Without the acceptance of the employees as end-users of the introduced technology, the usage and success of IT-projects cannot be guaranteed in the long run (Krüger, 2014).

One effective measure to ensure acceptance of change in the public sector is to involve employees in the change process (O'Brien, 2002). Involving employees into IT-projects should increase acceptance, as they personally contribute to the projects. Employee participation and involvement into the development process of IT-projects has been an established strategy in the software industry for decades. Within the context of user centred design, projects are tailored to the requirements of the users, which can result in higher usability of software products and an increased acceptance and employee motivation (Dillon & Morris, 1996). These approaches are able to improve acceptance of planned changes as early as possible and resolve doubts and fears. Although several participation opportunities and methods exist to involve employees in IT projects in the public sector (Ben Rehouma, 2019) such approach is not yet fully applied in the practice (Ben Rehouma, 2018). Furthermore, the establishment of change management approaches based on participation in the public sector can prove a challenging task (Van der Voet et al., 2016).

Problem Statement and Research Questions

In the public sector employee participation plays a curricular role to ensure their acceptance of change and their effective contribution to their organization (O'Brien, 2002). Several studies recognize the effect of employees participation in the change process on their acceptance of this change (e.g. (Fernandez & Rainey, 2006; O'Brien, 2002; Reid, Riemenschneider, Allen, & Armstrong, 2008)). Nevertheless, there is so far no empirical evidence on the relationship between employees' participation in IT projects and their acceptance of IT. Researchers are challenging the overall surrounding positive effect of participation (e.g. (Holgersson, Melin, Lindgren, & Axelsson, 2018)) and recommend to investigate the causality between user participation in IT projects and their acceptance of IT in the public sector (Axelsson, Melin, & Lindgren, 2013; Ben Rehouma, 2020; Holgersson et al., 2018). In addition, certain mechanisms are required to ensure the integration of participation in the change management process in the public sector. Holgersson et al., (2018) find that user participation in IT Projects in the public sector is treated in an ad-hoc manner, without any context specific considerations, and without any directions or goals. It remains unclear at the one hand which effects participation has on the acceptance of IT in the public sector, and on the other hand, how participation can be integrated in IT projects in this sector. To the best of our knowledge, no research has been conducted to investigate the empirical evidence on the relationship between government employees' participation and their acceptance of IT. In addition, as mentioned previously, there a clear gap for investigating the integration of participation within IT projects in this sector. To fill this gap, we address the following research questions:

RQ1: Which influence does participation have on government employees' acceptance of IT?
RQ2: What are fundamental aspects to integrate participation in IT projects within the public sector?

In this work, we aim to advance the research filed by providing an empirical evidence on the relationship between employees' participation in IT projects and their acceptance of IT in the public sector. In addition, to identify fundamental aspects to integrate participation in IT projects within this sector.

To achieve this purpose, this study conducted a mixed research in cooperation with employees from public administrations and ministries in north Rhine-Westphalia as well as with employees from public administrations in Bremen. The results indicate that participation has a significant positive influence on government employees' acceptance of IT. However, as previously mentioned in the literature, it is important to avoid ad-hoc participation and to manage participation carefully to achieve

the expected benefits. Our results provide fundamental aspects, which we recommend to consider for integrating participation in IT projects to increase the acceptance of IT in the public sector.

Section 2 presents the state of the art including definitions of participation, an overview on change management approaches based on participation, previous research on participation in Information Technology (IT) projects in the public sector, and the established research model, that will be tested in the quantitative study. The methodology approach is described in detail in section 3. Section 4 provides the results first of the quantitative than of the qualitative study, which are than discussed in section 5. Finally, section 6 concludes our study, outlines implications for research and practice, and acknowledges limitations and future research needs.

STATE OF THE ART

Defining Participation

Participation can be defined as "the totality of forms, i.e., direct (personal) or indirect (through representatives or institutions) and of intensities; i.e., ranging from minimal to comprehensive, by which individuals, groups, collectives secure their interests or contribute to the choice process through self-determined choices among possible actions during the decision process" (Heller, Pusic, Strauss, & Wilpert, 1998, p.42). In literature, the term participation is often used as synonym for the term involvement. Whereas involvement is defined as "a subjective psychological state of the individual reflecting the importance and personal relevance that Information System (IS) users attach to a given system", participation refers to "the various design-related behaviours and activities that the target users or their representatives perform during the system development process" (Barki, Ecole, & Hartwick, 1991, p.487). Ives & Olson (1984, p.26) defined user involvement as "participation in the development process by members of the target user groups." The authors provide two dimensions of user involvement. The first dimension include mechanisms of user involvement such as steering committees, and representation on project teams, which can be examined as they relate to user attitudes and system use. The second dimension is process related and relies on the question at which stage in the development lifecycle is user involvement appropriate.

Markus & Mao (2004) updated IS participation theory and highlight the importance of managerial participants and of the consideration of those who do not participate such as managers. The authors point out that IT projects affect many more stakeholders than those who have participated in the development process such as intended users, who may not all have had the opportunity to participate in this process. Whereas "stakeholders are those who are likely to be affected by a solution, whose acceptance and use of that solution could be problematic, and who are therefore logical candidates for participating in solution development or implementation", participants are the subsets of stakeholders who are actually given the chance to participate in solution development and/or implementation activities." (Markus & Mao, 2004, 527). In this context, it is important to investigate the implications of who the participants are relative to the population of the affected stakeholders.

Change Management Approaches Based on Participation

Rank and Scheinflug (2010) define change management as " [...] the planning, implementation, control and stabilization of changes in strategies, processes, organization and culture with the goal of maximizing the effectiveness and efficiency of the change process and achieving the greatest possible acceptance of the affected managers and employees" (Rank and Bidjanbeg 2010, p18). Further definitions specify change management as a goal-oriented, strategic "shift regarding the [...] strategy, its processes, structures and culture. The aim is to make the change as efficient as possible and to integrate the people concerned into the process" (Spichalsky 2016, p11). Within the scope of this article and on the basis of the previously mentioned definitions, change management is defined as an ongoing process of involving employees and executives of a company or public administrations

in ongoing and future change initiatives and projects with the aim of achieving continuous acceptance of the outcomes of said initiatives and projects.

Various change management models have been developed in order to apply change management methods within companies and public administrations. These models divide the change management process into phases in order to facilitate applicability. In 1947 psychologist and social scientist Kurt Lewin published his three-phase model and thus was the first to define change management. Within the models first phase, called "Unfreeze", the hardened corporate and behavioural structures are "defrosted" and prepared for a future change. In this phase employees are informed of planned changes in current processes, organisational structures and IT-tools. Within the second phase the company transitions from its current performance level to a desired altered state. This can cause doubts, fears and resistances among the affected employees, which Lewin declares as core reason why the implementation of acceptance-improving measures have to be promoted in this phase. In the final phase, the increased level of performance is solidified. By means of process controlling methods, the target achievement of the change-project has to be evaluated. Lewin answered basic questions of change management and laid the groundwork for future models, such as the eight-phase model by John P. Kotter (Kotter, 1995) or the five-phase model by Wilfried Krüger (Helsper & Krüger, 2002).

The implementation of change management faces the challenges of the environmental complexity, which public administrations possess. The often times conflicting factors create difficulties for change projects (Van der Voet et al., 2016). Robertson and Seneviratne (1995) argue, that this complexity has negative effects on change management, which requires a common purpose and unity of employees in order to be utilized effectively.

Participation in IT Projects in the Public Sector

The described models and approaches based upon participation can be beneficial to public sector organizations working to achieve enduring organizational change (O'Brien, 2002). Within change management employee participation represents one core aspect (Stolzenberg & Heberle, 2009). Employees should actively participate in IT projects, in order to achieve long-term success (Van Der Voet, 2013). Stolzenberg and Heberle (2009) highlight the development and implementation of a vision and the communication, participation and qualification of those affected by changes as core aspects of change management (Stolzenberg & Heberle, 2009). In the public sector participation in terms of information and communication, training and support, active participation in project groups, formal participation of the staff council as well as the role of managers have been reported as important potential predictor of government employees' acceptance of IT, which should be deeper investigated in future research (Ben Rehouma, 2020). In this context, information and communication measures imply in addition to the arrangement of information events or the sending of newsletters, especially the active communication between line managers and their employees. Participation in training activities should not only be restricted to take part in standard training courses, but the government agencies should offer employees the opportunity to take part in advanced and customized training courses. In addition, employees can actively participate in project groups, transmit employees 'individual needs, test the new system, and provide feedback about the introduced system. According to (Aladwani, 2001) one effective participation strategy in change management is to inform potential users about the introduction initiatives of IT and communicate with them about the benefits of the system. In addition, training is a further important strategy that helps to get reluctant employees to welcome a new system. Teaching each of the various user groups, hands-on training, providing support staff and actively participating in the implementation process are critical drivers of IT acceptance and implementation success in this strategy. Regarding the involvement of employees within the development process of projects, a variety of methods can be applied (Herold, Fedor, Caldwell, & Liu, 2008). These methods are classified into three categories. The first category is active participation, i.e. the involvement of employees in project groups, workshops and the feedback collection, for instance via surveys. Another category defines participation as a supportive activity, for example, supplying staff with a dedicated

personal contact that helps to identify and solve problems. Lastly, the role of leading personnel is seen as its own category. Managerial leaders have an exemplary function and should act as role models and advocate for change by applying management measures such as motivating employees for the changes and supporting them accordingly.

Research Model and Hypothesis

To better understand the influence of participation on employees' acceptance of IT, we developed a research model as depicted in Figure 1. This model is based on the assumption that when using IT is mandatory, acceptance of IT become symbolic and refers to the mental acceptance of an innovation (Khosrow-Pour, 2002). In this case, many studies (e.g. (Brown, Massey, Montoya-weiss, & Burkman, 2002; Khosrow-Pour, 2002) recommend to investigate users' attitudes towards IT instead of behavioural intention to use IT as dependent variable for explaining IT acceptance. We follow this recommendation and use attitudes toward using IT as dependent variable in our model, since the use of IT in the public sector is mandatory.

Based on the above-mentioned state of the art, this study investigates the influence of government employees' participation in IT projects on their acceptance of IT as well as the role of manager in this context. This model includes the variables explored in (Ben Rehouma, 2020) and operationalize participation in the identified activities in terms of information, communication, training, support, active participation, as well as formal participation of staff council. The role of managers is investigated in terms of his or her exemplary function and applying of management measures such as motivation and support.

Numerous research studies reported on the positive effect that information has on employees' acceptance of change and attitudes toward IT. For instance, Fernandez & Rainey (2006) explain how information dissemination about the new programs leads to convince employees about this change and to a successful implementation of this programs. Bhattacherjee (2006) identified a positive effect of informational messages with source credibility on potential users' attitude toward IT. Hence, we hypothesize:

H1: Information is positively related to attitude towards using IT

An individual's general willingness to adopt technology is positively related with the communication flow in public organizations (Melitski, Gavin, & Gavin, 2010). Räckers et al. (2013) found that communication has a significant influence on behavioural intention to use IT. Communication is considered as an effective strategy to change the negative attitudes of potential users of an IT system (Aladwani, 2001). Therefore, we state that:

H2: Communication is positively related to attitude towards using IT

Employees' training has been found as one of the most influential factors, explaining the intention to use e-procurement systems in the public sector (Singh & Punia, 2011). Training can be used to shape beliefs about IT, which provide the basis for attitude formation toward this technology (Amoako-Gyampah & Salam, 2004). In addition to the improvement of users' behaviour and performance, the improvement of users' attitudes towards using the system is an instrumental positive outcome of users training (Galletta, Ahuja, Hartman, Teo, & Peace, 1995). Hung, Tang, Chang, & Ke (2009) have empirically demonstrated that government employees' training significantly influences their attitudes towards using IT. Therefore we hypothesize that:

H3: Training is positively related to attitude towards using IT

In addition to communication and training belongs support to facilitating conditions affecting the use of a system and has been identified as one of the important factors influencing users acceptance of IT (Seymour, Makanya, & Berrangé, 2007). Ngai, Poon, & Chan (2007) showed that technical support has a positive effect on attitudes towards using IT. We follow these findings and hypothesize:

H4: Support is positively related to attitude towards using IT

Active participation refers to the active contribution in the change process (Dachler & Wilpert, 1978). Employees in the public sector can actively participate in the introduction process of IT in the public sector e.g. in projects groups, in activities for testing prototypes and assessing the functionality as well as the usability of the system (Ben Rehouma, 2019). This kind of participation encourages employees to give feedback about the change during the implementation process (Fernandez, Rainey, & Rainey, 2017) and helps to reduce their resistance to change (Abramson and Lawrence 2001). We therefore hypothesize:

H5: Active participation is positively related to attitude towards using IT

One of the most important indirect participation forms is the participation of staff representatives such as trade unions and staff council (Horton, 2003). Since the participation of all employees in the introduction process of IT is not possible, several studies (e.g. (Ben Rehouma, 2018, 2020) agree on the importance of the formal participation of staff councils to ensure the transmission of staff interests and influence the decision making process. Accordingly, we hypothesize:

H6: Formal participation will positively influence attitude towards using IT

The role of managers in change management for the acceptance of IT in the public sector has been discussed in several studies (e.g. (Amoako-Gyampah & Salam, 2004; Brown et al., 2002; Damanpour & Schneider, 2006; Frank & Lewis, 2004; Ragu-Nathan, Apigian, Ragu-Nathan, & Tu, 2004). In this context, managers are supposed to be role models, should act with an exemplary function in using IT themselves, and should apply management measures such as communication and support to ensure the use of IT by their employees. Accordingly, the following hypotheses were proposed:

H7: The exemplary function of a manager is positively related to attitude towards using IT
H8: Management measures are positively related to attitude towards using IT

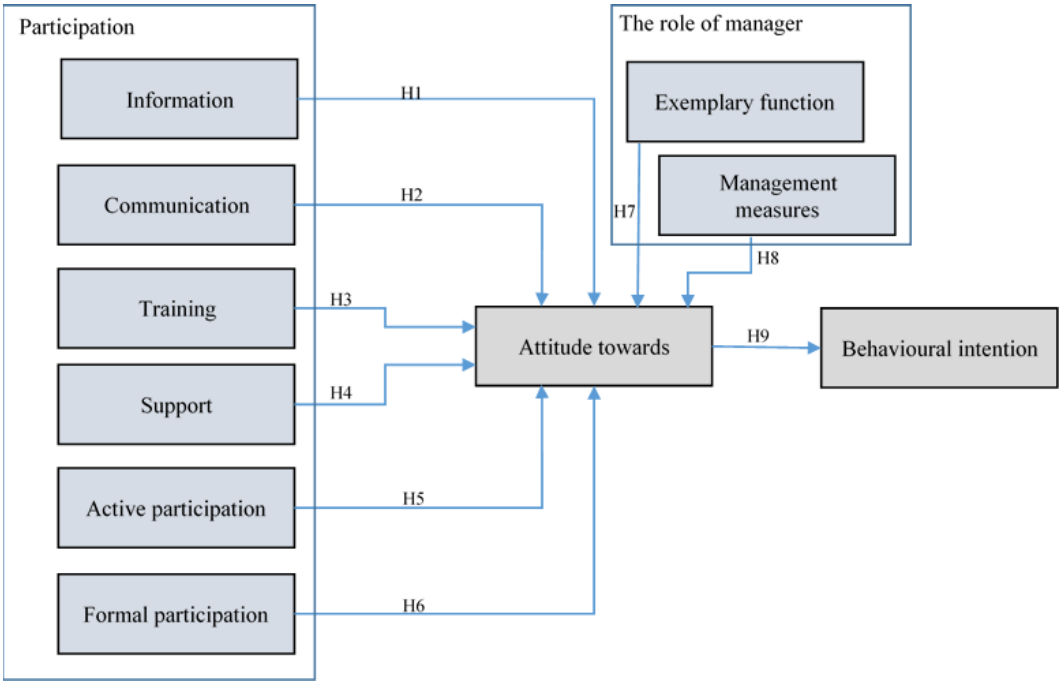
In a voluntary use context, there is a consensus in the literature on the positive relationship between attitudes towards using IT and behavioural intention to use IT, which is not the case in studies, where the use of IT is obligatory. Therefore, we like to investigate this relationship in the mandatory context and follow further studies (e.g. (Räckers et al., 2013; Shen & Chuang, 2010)), where attitude toward using IT is described as a predictor of behavioural intention to use and propose:

H9: Attitude towards using IT is positively related to behavioural intention to use IT

METHODS

Our research uses a mixed methods approach combing quantitative and qualitative data following the triangulation mixed methods design according to (Creswell & Plano Clark, 2007). The combination

Figure 1. Research Model



of both methods has a substantial value in IS research (Kaplan & Duchon, 1988). The triangulation design is suitable to gather complementary yet distinctly data from different sources and to integrate them for analysis and interpretation (Almalki, 2016). The quantitative approach aims to test our hypothesis and primarily to answer the first research question and the qualitative approach primary focuses on the second research question.

Quantitative Approach

Data Collection and Analysis

For this part of our research, we collected data from February 5th to March 15th in 2019 using a standardized online questionnaire, which was sent randomly using a simple random sampling technique to employees of a local government administration in Germany. The simple random sampling method gives every possible sample the same probability to be chosen among the population (Meng, 2003). Our questionnaire was structured based on our presented hypothesis and the items developed based on state of the art on participation in IT projects in the public sector (see *Table 1*). In addition to the assessment of our presented variables, participants were also asked to assess the existing opportunities for participation in their administration, if participation is important for them, and whether they would like to participate in IT projects in the future. All independent variables, were measured with items using a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Attitude towards is measured by the participant's evaluation of the own attitude towards using IT (0 =negative; 1= neutral; 2 = positive). Behavioural intention was measured by the participant's degree of readiness to use new IT applications (0 = not ready; 1 = partly ready; 2 = fully ready).

Our questionnaire was pre-tested by one professor with a background in IS, two experienced researchers, and by the staff council of a government administration, which led to few adjustments in our questionnaire according to the received suggestions. In total 104 government employees started the online survey, 99 participated and 78 completed the questionnaire.

Table 1. Items used in the questionnaire of this study

Variable	Survey Item
Information (Inf)	
Inf1	I was informed about the introduction of new IT
Inf2	I received newsletters on the new IT
Inf3	I received instructions regarding the new IT
Communication (Comm)	
Comm1	The introduction of IT is communicated in my office
Comm2	There is a contact person for communication in my office
Training (Train)	
Train1	I received standard training
Train2	I received advanced training
Train3	I received customized training
Support (Supp)	
Supp1	I received support for solving my problem with IT
Supp2	I received support in my own desk
Active Participation (ActivePart)	
ActivePart1	I participated in project groups
ActivePart2	I participated in survey procedures
ActivePart3	I participated in design activities
ActivePart4	I participated in testing prototypes
ActivePart5	I participated in evaluating the system
ActivePart6	I participates in feedback activities
Formal Participation	
FormalPart1	I received information about the system from the staff council
FormalPart2	I gave feedback about the system to the staff council
Management Measures	
ManagMeas1	My supervisor motivate me for using IT
ManagMeas2	My supervisor support me in using IT
Exemplary function	My supervisor is for me a role model in dealing with IT
Attitude towards	My attitude towards using IT
Behavioural intentions	For using IT at the workplace, I am

For the data analysis, we employed the Statistical Package of Social Science (SPSS) Version 26 to test our hypothesis. We performed a correlation analysis based on Pearson as well as a regression analysis to identify the coefficient of determination R^2. The Pearson correlation coefficient measures the strength of the correlation between two variables and the coefficient of determination R^2 measures the proportion of variation in the dependent variable explained by the independent variables (Hinton, Brownlow, & McMurray, 2014). In addition, we performed a univariate ANOVA to test the differences between groups with positive, neutral and negative attitude towards using IT. Excel Spreadsheets were used for the descriptive statistics.

Qualitative Approach

For this part of our research we collected data from federal government administrations in north Rhine-Westphalia using expert interviews from October 11th to November 18th in 2018. Our interview guideline was structured based on our presented research questions and objectives (see *Table 2*). Our choice of the participant interviewees is based on the recommendation of (Harald A. & Näf, 2005) who defines an expert as an individual who possesses specific knowledge and skills based on years of experience. The experts we recruited for our research fulfilled this criterion. The intended user

Table 2. Examples of the questions used in the interviews

Goal	Example of Questions
Gain insight into previous uses of employee participation methods.	Which forms of employee participation have you made use of in the past? Did you conduct a preselection? How was this selection performed?
Determine preferred methods on the basis of past experience	Given free reign, which methods of employee participation would you have chosen?
Inquiring the current status quo and procedures.	Which methods are used in regards to employee participation currently? How can these acceptance-improving methods best be integrated into IT projects in the public sector?

group of the interviews were individuals in decision making positions, e.g. IT project managers, IT managers, project management staff, department heads, etc.

The interviews were scheduled to have a duration of 45-60 minutes. Within this time, the participant's experiences regarding employee participation, project processes and their views regarding the integration of employees into IT projects were assessed. In addition, the preferences of the experts with regard to the selection of participation methods in change management were investigated. The interview guideline is divided into two sections that specifically cover each of the research questions.

The first section of the interview followed the goal to determine the experts' experiences with participation in past IT projects and the effect of the applied participation methods on the acceptance of the employees. The initial section of the interview inquires the experts' fundamental attitude towards employee participation in general and their knowledge concerning suitable participation methods. The interview partners were then asked to share their experiences with employee participation in IT projects and which participation methods they believe to be most suitable.

The second section of the interview guideline focused on fundamental aspects for applying these participation methods and procedures in the public sector. It was discussed how these participation methods can be implemented into change management process in the public sector. The aim of these questions were to determine the experts' preferred strategies to integrate participation within change management in the public sector.

In the next chapter, the results of the quantitative and qualitative analysis are presented in detail.

RESULTS

Quantitative Analysis of Participation in IT-Projects in the Public Sector

Validity and Reliability Analysis

We present in *Table 3* the validity and reliability of our measurement using Cronbach's Alpha (α) for the internal consistency of our constructs and VARIMAX rotation matrix for factor analysis to assess the convergent validity. In general, a reliability value of 0.90 and above is considered as excellent, between 0.70 and 0.90 as high, between 0.50 and 0.70 as moderate, and of 0.50 and below as low (Hinton et al., 2014). Except the moderate reliability of communication, all other variables demonstrate a high or excellent reliability. The exemplary function of manager, attitudes towards using IT and behavioural intentions were measured respectively using a single item. The rotated factor loadings was performed with an eigenvalue larger than 1 and removed the correlations that are of 0.3 or less. The matrix extracted 7 factors and showed how the items load on each factor. Two items were excluded from the survey due to the low value of factor loading.

Table 3. Results of the Validity and Reliability Analysis

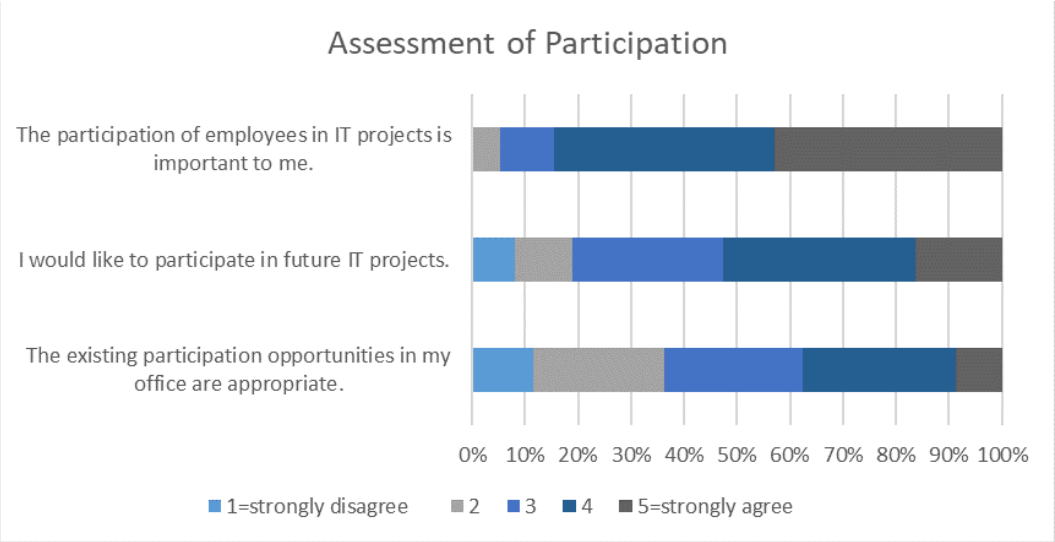
Variable	Number of Items	Items	Factor Analysis	Cronbach's Alpha (α)	Sample (n)
Information	3	Inf1	0.732	0.74	78
		Inf2	0.624		78
		Inf3	0.747		78
Communication	2	Com1	0.690	0.55	78
		Com2	0.665		78
Training	3	Train1	0.755	0.76	78
		Train2	0.767		78
		Train3	0.650		78
Support	2	Supp1	0.707	0.90	78
		Supp2	0.521		78
Active participation	6	ActivPart1	0.799	0.87	78
		ActivPart2	0.832		78
		ActivPart3	0.807		78
		ActivPart4	0.844		78
		ActivPart5	0.809		78
		ActivPart6	0.786		78
Formal participation of the staff council	2	FomalPart1	0.868	0.69	78
		FomalPart2	0.844		78
Management measures	2	ManagMeas1	0.870	0.86	78
		ManagMeas2	0.877		78
Exemplary function	1			-	78
Attitude towards	1			-	78
Behavioural intentions	1			-	78

Identification of the Current Situation of Government Employees' Participation in IT Projects in the Public Sector

Based on the results of the survey, 83% of respondents feel sufficiently informed about the introduction of IT projects in their agency and according to 78% the introduction of new IT applications is well communicated. In terms of training, 85% of the respondents state that they have participated in standard training courses, and 61% have participated in customized training courses. Furthermore, 73% state that they have received support at their workplace. Concerning active participation in IT-Projects, only 25% of the respondents were involved in such projects. While 64% were not involved in activities for surveying the existing work processes, only 25% of respondents confirmed that they have been involved in testing new IT applications, and 66% of respondents were involved in further feedback activities about these IT applications.

An important aspect that was also examined in the survey is the assessment of participation. As we can conclude from Figure 2 about 44% of the respondents consider the existing participation opportunities to be inappropriate. Nevertheless, 88% of the respondents consider that the participation of employees in IT projects is important and 65% would like to participate in IT projects in the future.

Figure 2. Assessment of participation



A further important aspect that we have addressed in our questionnaire is the manager role. About 69% of respondents feel motivated by their managers to use new IT applications, and 60% said that they receive support from their managers when using new IT applications. The exemplary function of managers was confirmed from about 48% of respondents.

Hypothesis Tests

The univariate ANOVA shows a significant difference between groups with positive, neutral and negative attitude towards using IT for information with p=0.015, communication with p=0.0004, support with p=0.01, active participation with p=0.006, and for the role of managers with a significant difference with p=0.03 for the exemplary function and p=0.02 for management measures. The main differences are for all variables between groups with negative and groups with positive attitudes towards using IT.

The correlation analysis indicates an overall highly significant relationship and moderate positive correlation between the variables in H1 to H9 expect H6 (see *Table 4*). Looking at participation constructs, support seems to have the strongest correlation with the attitudes towards using IT followed sequentially by communication, active participation, information, and training. The role of the managers indicates likewise a significant correlation with attitude towards using IT. In contrast to the participation of the staff council, which not indicates any significance for employees' attitude towards using IT.

Based on the coefficient of determination R^2 we can explain, except of H6 about 7.1% to 17.5% of the variance in our dependent variable attitude towards using IT. The R^2 value of 0.415 indicates that 41% of the dependent variable behavioural intentions can be explained by attitude towards using IT. The findings indicate that all hypothesis (H1 to H9) except of H6 are significantly supported.

In summary, we can conclude that employees' participation in IT-projects in the public sector has a significant correlation with their attitude towards using IT and helps in moderate manner explaining their acceptance of IT.

Table 4. Results of the Pearson's correlation and the linear regression analysis of the constructs in H1 to H9

Hypothesis	H1	H2	H3	H4	H5	H6	H7	H8	H9
Pearson	0.329**	0.399**	0.266*	0.401**	0.354**	0.068	0.306**	0.290*	0.644**
R^2	0.108	0.159	0.071	0.175	0.126	0.005	0.094	0.084	0.415

**p<0.01 *p<0.05

Qualitative Analysis of Participation in IT-Projects in the Public Sector

The expert interviews conducted in different ministries resulted in several key findings, which we present in this chapter. Concerning upcoming changes in organisational structures, processes and IT, particularly employee participation has the potential to increase the acceptance of IT-solutions during their development but also after their completion. The fact that several IT-projects have failed in the past, due to missing employee involvement, makes the consideration of employees' participation even more important. The reasons for this were firstly an irregular distribution of information and secondly a lack of attention for suggestions and critique made by affected personnel. This resulted in IT-solutions, which often do not fit specified user requirements. Additionally employees have built up resistances during the IT-development in the past, which resulted in their refusal to work with project results. They would refuse to acknowledge the positive changes the project had on work procedures and would continue to rely on old methods and systems. Several experts described this situation. In order to avoid such a situation in the future, it was stated that, employee participation should be considered in order to enable a project to have long-term positive effects.

Definition of a Participation Framework and Suitable Methods in the Project Initiating Phase

One aspect that was mentioned in the expert interviews is the accurate and detailed planning of project scope, size and a communication strategy in the project initiating phase. An expert recommended that an established framework for employee participation like the 8-phase Model (Kotter 1996) should be applied in this early planning phase. Already in this early project phase it should be determined as to what extent the suggestions and criticism of employees should be taken into account. An aspect to consider in this regard is that too much employee participation may also lead to undesired consequences, such as too many extra wishes made by the employees. If these wishes are not considered, because they might be outside of the scope of the project, employees may in turn become frustrated. In addition to this, considering all recommendations may lead to significant additional efforts and costs. A balance needs to be found in that issue. In order to prevent these issues from surfacing, the degree of participation needs to be defined. This should be done based on the projects' scope, goals and involved groups. The degree of participation must be communicated to the involved employees as soon as possible. This can reduce potential frustration regarding employees' neglected feedback and requests. Furthermore it became obvious that the project management is confronted with the pressure to implement employee feedback if this communication doesn`t happen.

Choosing the Most Suitable Participation Methods

The second aspect focuses on the selection criteria for choosing the most suitable employee participation methods. According to the experts, no universally valid approach for employee participation exists as the scope and degree of standardization for each project is unique. Change management methods must be chosen in accordance to the projects' scope, the framework conditions and the targeted user group. The level of hierarchy, which participation will be used in, has to be specified. This is because different approaches have to be considered, according to the hierarchy level and the technical knowledge of the affected employees. The involvement of a group of IT-department managers would

require other participation methods than regular members of staff from a lower hierarchical level. Concerning the scope and degree of standardization of a project, it is advisable to directly recruit a small group of end users with specialist knowledge, in case of IT-project with the scope of creating a highly specific user system with low standardization. In this case, the technical expertise of the employees should be considered in the requirements specification phase. This can be done by using methods like focus groups or workshops.

The involvement of these specialists can be reduced in later project phases, as their feedback was directly integrated into the early development process. IT projects with a low degree of standardization and a large user base require an opposite approach. The experts suggested that the affected parties should only be involved after the system requirements have already been fundamentally defined. This can be done with the use of large-scale feedback collection methods such as surveys or online questionnaires. The aim of this participation approach is to use the suggestions and possible criticism from a large group of users to improve upon a created prototype. Moreover, this approach can reduce the coordination effort in the initial planning phase of the project. As part of this approach, employees will be involved into the planning of participation. As an example, prior to the official roll-out of a new IT-tool, employees give recommendations to determine suitable organizational units, in which the roll-out could begin. Newly developed IT-systems may require training, to ensure an optimal level of performance. In this case, project staff could interview employees to determine the content and scope of the training sessions.

Utilization of Established Methods

In the previous paragraphs the definition of a participation framework and the selection criteria for methods were presented. This paragraph focuses on the methods that have been used in past projects and have been considered as successful.

In the context of feedback collection during projects, surveys and questionnaires can deliver insights concerning the widespread acceptance of a project. Surveys are best utilized in advanced phases of projects and should involve all affected employees. For in-depth feedback about projects during the project execution, the personal interview is the method of choice. Within these interviews, the employees' personal opinion, fears and problems regarding the project can be assessed. The experts recommend limiting the amount of employee interviews, so that the planning of these employee interviews remains manageable. However it was also noted, that in order to adhere to privacy regulations, a minimum of seven participants for surveys and interviews are necessary. Otherwise, the anonymity of the information cannot be guaranteed, as noted by the experts.

In addition to feedback collection, interviews can be used in other phases of the project to gather information. They represent an effective tool in employee participation, as they can also be used to involve employees into the planning and execution phase of projects, e.g. in a requirement analysis for an IT-project.

In regard to active participation of employees, workshops have proven to be effective in involving employees into the development of IT-Systems. Groups of employees can comment, discuss and give feedback on the current project status. Moreover, project artefacts such as prototypes can be shown and tested by these work groups. Although they require extensive preparation as well as time for precise evaluation, the experts stated, that workshops have shown very positive results in regards to improving acceptance.

In order to facilitate the learning results of a workshop, an expert recommended the method of the "Corridor Runner". In this method, an employee with in-depth knowledge about the workshop topic assists the workshop attendees in order to refresh the information they have learned. They act as a personal contact and private trainer. This method has shown very positive results in the past. Likewise, a school-based system of training was considered as a promising approach for continuous learning. After the completion of a workshop, the trained employees continue to practice using the

new IT-tool and report their progress to a member of the projects' development team. They are then given feedback on their learning results for improving acceptance.

A promising method in preventing change related fears gives employees the opportunity to experience future IT-solutions first hand. With this method, IT-solutions are prototyped and made presentable. These solutions are then available to employees, who can test the prototypes within short testing sessions during the workday. This allows employees to familiarize themselves with upcoming changes. In addition, they are able to give feedback on the prototype, which can be considered during further development.

Establishment of an Information Dissemination Plan

The fourth aspect focuses on the dissemination of information during IT-projects. In order to provide adequate information regarding project status and results regularly a target group specific information distribution plan should be created and implemented. This policy regulates the information flow within the project team as well as the communication with involved employees outside of the project team. An expert described, that the neglect of using an information distribution plan can cause confusion within the project team. This confusion can stem from redundant information being sent or unaffected employees being messaged. As previously stated, the information distribution plan can prevent this erroneous distribution; however, it can have additional beneficial effects. One such effect is that it creates transparency over the projects current status. Through this transparency, the projects' susceptibility to errors can be reduced, because internal project information is readily available for all project members and involved employees. This enables them to detect potential issues, mistakes or oversights in the project.

Within an information dissemination plan, a multitude of factors need to be considered. Firstly, the project management needs to define which stakeholder group is affected by the project in which extent. Based on that, a group specific policy (e.g. what information is distributed in which intervals) has to be established. This policy includes factors such as urgency, the communication systems used to send and receive information but also which communication channels need to be applied. Upward channels are intended to provide weekly status reports, email updates and in-person reviews with stakeholders in superior positions. Alternatively, a downward channel is intended to communicate with the project team on project tasks, as well as sharing project-internal information. Lastly, lateral communication channels are intended to communicate with employees for example through email updates (Fred C. Lunenburg 2010). After selecting the communication channels for each stakeholder group, the form of communication needs to be determined, such as face-to-face communications in meetings, hard-copy communications, through letters or reports, or through electronic means, such as emails, videoconferences, etc.

DISCUSSION

Our findings from both approaches reveal that employees' participation is as a critical factor for the acceptance and success of IT projects in the public sector. To answer our first research question RQ1 "Which influence does participation have on government employees' acceptance of IT?" the quantitative approach investigated the empirical evidence on the relationship between participation and IT acceptance. The results showed that even if many participation methods, especially those related to active participation for feedback collection are not sufficiently used in practice, the majority of the surveyed employees believe participation to be important and they would like to participate in IT projects in the future. In addition, the quantitative approach has confirmed that employees' participation in the form of information, communication, training, support and active participation in IT projects as well as the manager role in terms of his or her exemplary function and applying of management measures to motivate and support employees using IT in the public sector, all have a significant positive linear relationship with employees' attitudes towards IT. These findings are in

line with different previous studies, which support this positive effect on users' acceptance of IT (e.g. (Aladwani, 2001; Damanpour & Schneider, 2008; Hu, Clark, & Ma, 2003; Hung et al., 2009; Muneera & Didar, 2015). Our results enhance these studies by providing the empirical evidence on participation and acceptance in terms of different participation activities applied along the whole introduction process of IT bevor and after the introduction of an IT system. Our results show the importance of several participation measures, which affect all the intended users of the introduced system as well as further stakeholder such as managers, who may perhaps not use the system. As previously mentioned in the state of the art, it is important by participation to consider not only the hand-on users, but all the employees who are affected with the introduction of this system. In addition, our qualitative approach also clearly supported this relationship and reported on the effect of employee participation in increasing the acceptance of IT-solutions during their development as well as after their completion. However, our findings showed no significance relationship between the formal participation of staff council and employees acceptance of IT in contrary to previous studies, which support this relationship (e.g. (Ben Rehouma, 2020)).

Furthermore, our qualitative analysis identified key aspects for the integration of participation in IT within the public sector. For answering our second research question RQ2 "What are fundamental aspects to integrate participation in IT projects within the public sector?" the results of this approach reveal that employees' participation in IT-projects in the public sector should be precisely defined in an early project planning phase. A framework should serve to manage participation in all subsequent project phases. Ben Rehouma (2019) argued that employees' participation in IT projects in the public sector should be managed carefully, in order to achieve the expected benefits. One major part of a framework should consider the extent and degree of participation. Public administrations should avoid ad-hoc participation without clear direction and goals and provide a concrete advice of user participation (Holgersson et al., 2018). A further aspect is the consideration of the pressure project management could have in responding to and in implementing the collected feedback from the employees. Managing effective participation in IT projects is a big challenge, which requires providing time off in lieu from daily work as well as relaxing deadlines (Kensing & Blomberg, 1998).

Furthermore, we argue that criteria of employee participation methods should be selected in accordance to the projects' scope, the framework conditions and the targeted user group. Whereas standard IT projects for a large target user groups claim more participation in later project phases, customized or smaller IT-projects for a specific target group require more participation from a specified group in earlier project phases. In addition, the level of hierarchy, in which participation will be used, has to be specified. That means that the choice of the appropriate participation method depends not only on the above mentioned criteria such as the project scope and the target group but also on the hierarchy level and the IT-skills or technical knowledge of the employees. Karlsson et al. (2012) indicated that unclear user target segments, the nature of participation, and the lack of adequate skills are big challenges in the context of e-service development that need to be considered when choosing between different participation approaches in pubic administrations. Moreover, we also suggest involving employees into the planning of participation for example in activities for testing the system before the rollout or for the development of training concepts. Ben Rehouma (2019) evaluated several employees' participation methods, that can be used in IT-projects in the public sector and reveals that is important to involve employees in such activities. Employees can be consulted to determine the content and scope of training and evaluate it for possible improvements. In this context employees as real users, can test the system in a real environment and give feedback about it through for instance surveys or interviews. Such methods are well applied in the public sector to collect feedback during projects. Surveys, questionnaires and interviews can deliver insights concerning the widespread acceptance of a project. The active participation of employees in workshops and in school-based training system are also well established methods used in the past. Regarding the extensive pool on participation methods, the missing of management and of knowledge concerning the methods used for participation in IT projects in the public sector is considered as one of the main reasons for

a lack of employees' participation in this sector (Ben Rehouma, 2018). In addition to the previous mentioned aspects, our analysis supports the utilization of established methods that have been used in past projects and have been regarded as successful.

As previously mentioned, information and communication are important participation basics that influence government employees' acceptance of IT. This study propose the establishment of an information dissemination plan, which provides adequate information about the project status. This policy helps creating transparency, detecting potential mistakes, and regulating the information flow and communication within different stakeholder. The participation of employees helps reduce resistance to change by promoting the dissemination of critical information and encouraging employee feedback for possible improvement of the change during implementation (Fernandez et al., 2017). Employing different forms of active participation as well as written and oral communication among employees helps convincing them of the need for a change (Fernandez et al., 2017). Not only the form of communication needs to be determined in this aspect, but also the selection of communication channels for each stakeholder group. Sanina et al. (2017) analysed what channels should be used and in what combination and showed the effectiveness of the use of different communication channels such as face-to-face as well as mediated communication to achieve the desired result from government communications.

We believe that change management approaches based on employees' participation have to be adopted in the public sector to achieve a successfully implementation and acceptance of IT-projects. On the base of our findings and their consistent with previous literature, we recommend to consider our key findings when implementing IT projects in the public sector.

CONCLUSION, IMPLICATIONS AND OUTLOOK

The aim of our research was to investigate the empirical evidence on the relationship between government employees' participation in IT projects and their acceptance of IT. In addition, this research study aimed to identify fundamental aspects, which help integrating participation in IT projects in the public sector, in order to increase employees' acceptance of IT and to achieve a successfully introduction of IT projects in this sector. To achieve this purpose, we conducted a quantitative and qualitative research using surveys in a local public administration in Germany, and expert interviews in ministries in north Rhine-Westphalia.

Thus, we highlighted in answering our first research question that employee participation in IT-projects has a significant linear relationship with their attitudes towards using IT. Our results show that participation can have multiple beneficial effects on the acceptance of IT in the public sector. Participation in terms of information, communication, training, support and active participation using different methods has a significant correlation with employees' attitude towards using IT and helps explaining their acceptance of the changed processes and application systems in this sector. Furthermore, the role of managers was also identified as an important factor influencing government employees' acceptance of IT. Through our research, we found that whilst the information dissemination regarding IT-projects and their induced changes are high amongst employees, the actual participation of employees within IT-projects remains low (around 25%). In relation to this, 88% of surveyed employees answered that they believe participation to be important for IT-projects and 65% declared, that they would be willing to make use of participation possibilities. In addition, we investigated multiple methods and procedures that have proven successful in the past such as interviews, focus groups, workshops and surveys, which are suitable to actively involve employees during the change process such as for feedback collection during projects or for the development or testing the IT solution.

Additionally, we identified fundamental aspects for integrating participation in the public sector (RQ2). We found four key aspects presenting strategies and methods for the definition of participation frameworks, the selection of suitable methods in the project, the utilization of established methods as

well as the establishment of an information dissemination plan. We strongly recommend to consider these aspects zo successfully integrate participation in IT projects in the public sector.

Our findings have several implications for theory and practice. Our study enhances previous research on employees' acceptance of IT in the public sector by empirically testing the evidence of the influence of government employees' participation in IT-projects on their acceptance of IT and showing how participation matters in this context. In doing so, this study identified six determinants of government attitudes toward IT, in the following sequence: support, communication, active participation, information, training, and the role of managers. This study showed also that even though the use of IT in the public sector is mandatory, government employees' attitudes towards using IT influence their behavioural intention to use this technology. We suggest researchers to deeper investigate factors influencing government employees' acceptance of IT and look beyond the technical factors and traditional models of IT acceptance. Indeed, researchers investigating employees acceptance within contextual perspective identified several important factors influencing employees acceptance of IT in the public sector such as participation and the role of manager (e.g.((Ben Rehouma, 2020; Damanpour & Schneider, 2006). In addition, government policy makers can use our key findings as strategy to integrate change management based on participation into IT projects within the public sector. Our identified fundamental aspect help managers in the public sector as policy for managing effective participation.

This study has several limitations. We cannot generalize the findings, since the sample of the study is limited and the study was conducted in only two federal states in Germany. Researchers can investigate employees' participation in IT projects with many more stakeholders (as well further experts) and in other cities and countries. In addition, researchers can explore more key factors, which could help integrating employee participation within the public sector. Future research may focus on further possibilities of change management within the public sector as well as of the participation of employees in IT projects specifically.

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